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Fairfax County
Wastewater
Management

FINAL REPORT

Sewer System Certification Report

for Fiscal Year Ended June 30, 2015

June 2016

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Integrated Sewer System

County of Fairfax, Virginia
Department of Public Works & Environmental Services
Wastewater Management

FINAL

SEWER SYSTEM CERTIFICATION REPORT

FOR FISCAL YEAR ENDED JUNE 30, 2015

June 2016

**FAIRFAX COUNTY
WASTEWATER MANAGEMENT**



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Executive Summary

In accordance with Fairfax County's bond resolution, Hazen and Sawyer has prepared the Sewer System Certification Report for the Fiscal Year (FY) ended June 30, 2015. This report confirms that the Fairfax County Wastewater Management Program is satisfactorily operating and maintaining the County's wastewater system and the Program's budget is sufficient to meet operational, maintenance, debt service and capital "Pay-as-You-Go" (PAYGO) funding needs. The Wastewater Management Program uses calculated financial indicators to ensure adequacy of its rates from a cash flow, business, and compliance standpoint.

Hazen and Sawyer evaluated the management, funding, operation and maintenance of the Fairfax County Wastewater Management Program. This was accomplished primarily by interviewing staff from each of the three Divisions within the County's Wastewater Management Program and visiting the Noman M. Cole, Jr. Pollution Control Plant (NMCPCP), various collection system pumping facilities and several flow monitoring sites. The team also evaluated operating data from FY 2015 capital improvement plans, revenue and bond information, revenue sufficiency and rate analysis report, five-year financial forecast and sewer service charges, and comprehensive annual financial report (CAFR).

The Wastewater Collection Division (WCD) continues to take a very proactive approach towards maintenance and strives for continuous improvement in daily operation. WCD maintains facilities at a high competency level.

The Wastewater Treatment Division (WTD) has an exemplary record of producing a high-quality effluent that surpasses regulatory requirements at a low unit cost relative to other advanced wastewater treatment plants in the region. Rehabilitation and replacement of facilities that have reached the end of their useful service life at the plant continues to be a main focus for WTD.

Establishment and management of future requirements for the Wastewater Management Program in regards to expansion needs of facilities is performed by the Wastewater Planning and Monitoring Division (WPMD). WPMD also analyzes funding levels for needed equipment and facility replacement programs. WPMD and the County Department of Finance work together annually to create award winning CAFR for the Integrated Sewer System.

The Environmental Monitoring Branch of WPMD documents the high quality of the County's wastewater effluent. While actively promoting education and outreach throughout the County,



Environmental Monitoring Branch prepares audits, confirms discharge quality, and runs a successful Industrial Pretreatment Program.

The Wastewater Management Program continues to meet its strategic planning goals. The Program has maintained its AAA bond rating from Fitch and Standard & Poor and Moody's recently upgraded the Programs' bond rating to Aaa making Fairfax Sewer Revenue Bonds the first and only triple, triple-A rated sewer revenue in the nation. These CAFRs are submitted to the Government Finances Officers Association of the United States and Canada (GFOA) for certification review. The rate schedule is reevaluated annually to determine its adequacy for cost recovery and has already been adopted for the coming year. The system complies with the Debt Service Coverage Ratio requirement of its bond resolution, and all forecasted coverage ratios for FY 2015 to FY 2021 exceed required levels. The County's availability fees are consistent with the fundamental principle of "Growth-Pays-for-Growth." This principle is used to calculate the availability fee, ensuring that growth-related costs are recovered proportionally from new development.

Through conducting staff interviews, it was evident that the Program has well-organized leadership that emphasizes long-term cost-effectiveness, productivity, participation by staff, and collaborative teamwork. Site visits confirmed that the facilities are well operated and are properly maintained and that projects scheduled for implementation in the previous fiscal year are under construction or successfully operating.

Additional evaluations reveal that funding for the Wastewater Management Program is adequate to meet the system's needs. The Fairfax County Wastewater Management Program is prepared to meet the current and future needs of the system, satisfactorily operates and maintains the County's integrated wastewater system, and has a budget that is sufficient to meet funding needs.



Section 1 Introduction

Section 713(b) of the Fairfax County Sewer Bond Resolution requires the County of Fairfax to retain an engineer annually to review the status of the Wastewater Management Program and Integrated Sewer System and prepare this report documenting the findings. This process ensures that the system is operated and maintained in a satisfactory manner and that the budget is adequate to meet the operational, maintenance and capital needs of the system for the next fiscal year.

Hazen and Sawyer was retained to prepare the Sewer System Certification Report and document the status of the Integrated Sewer System during FY 2015 which ended on June 30, 2015. To prepare this report, Hazen and Sawyer performed the following tasks:

- Interviewed key Wastewater Management Program personnel including Division Directors, Branch Chiefs and selected personnel regarding FY 2015 activities and proposed FY 2016 efforts.
- Reviewed operation and maintenance related documents.
- Reviewed the Comprehensive Annual Financial Report for FY ended June 30, 2014 and June 30, 2015.
- Reviewed budgetary information including the FY 2016 adopted Budget, Capital Improvement Plan (FY 2016 - FY 2020), financial statements and a sewer service charge/availability fee study.
- Reviewed the Annual Disclosure Report for FY 2015.
- Reviewed Wastewater Revenue Sufficiency and Rate Analysis Forecast Period Fiscal Year 2016 Through Fiscal Year 2021.
- Visited existing Integrated Sewer System facilities including the Noman M. Cole, Jr. Pollution Control Plant (NMCCPCP) and selected sewage pumping stations and flow monitoring sites to assess general conditions and overall performance.

Section 2 of this report evaluates the operation and maintenance of the Wastewater Management Program and Integrated Sewer System. Section 3 examines the funding structure of the system and the FY 2015 budgets of each Division. Section 4 summarizes the FY 2016 Capital Improvement Plan and Section 5 discusses rates and revenues.



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Section 2 Wastewater Management Program Operation, Maintenance and Management

2.1 Wastewater Management Organization

The Fairfax County Wastewater Management Program encompasses wastewater collection, wastewater treatment, environmental monitoring, wastewater capacity planning, and management of financial operations and interjurisdictional agreements. The Wastewater Management Program operates under the Department of Public Works and Environmental Services (DPWES). The Wastewater Management Program provides integrated sewer collection and wastewater treatment services for Fairfax County residents and businesses, as well as for other neighboring jurisdictions through sales of service agreements. Wastewater Management Program functions are carried out by three divisions under the supervision of the Deputy Director of DPWES, as described in this section.

The County follows the High Performance Organization model using a core team to provide leadership and management for the entire Program. The Wastewater Management Leadership Team focuses on long-range planning, strategy, continuous improvement, wastewater capacity issues and financial management.

2.1.1 Divisions

Three Divisions within DPWES are responsible for the operation, maintenance and management of the integrated sewer system. Figure 2-1 shows the organization of the Integrated Sewer System Wastewater Management Program. Each division is described below.

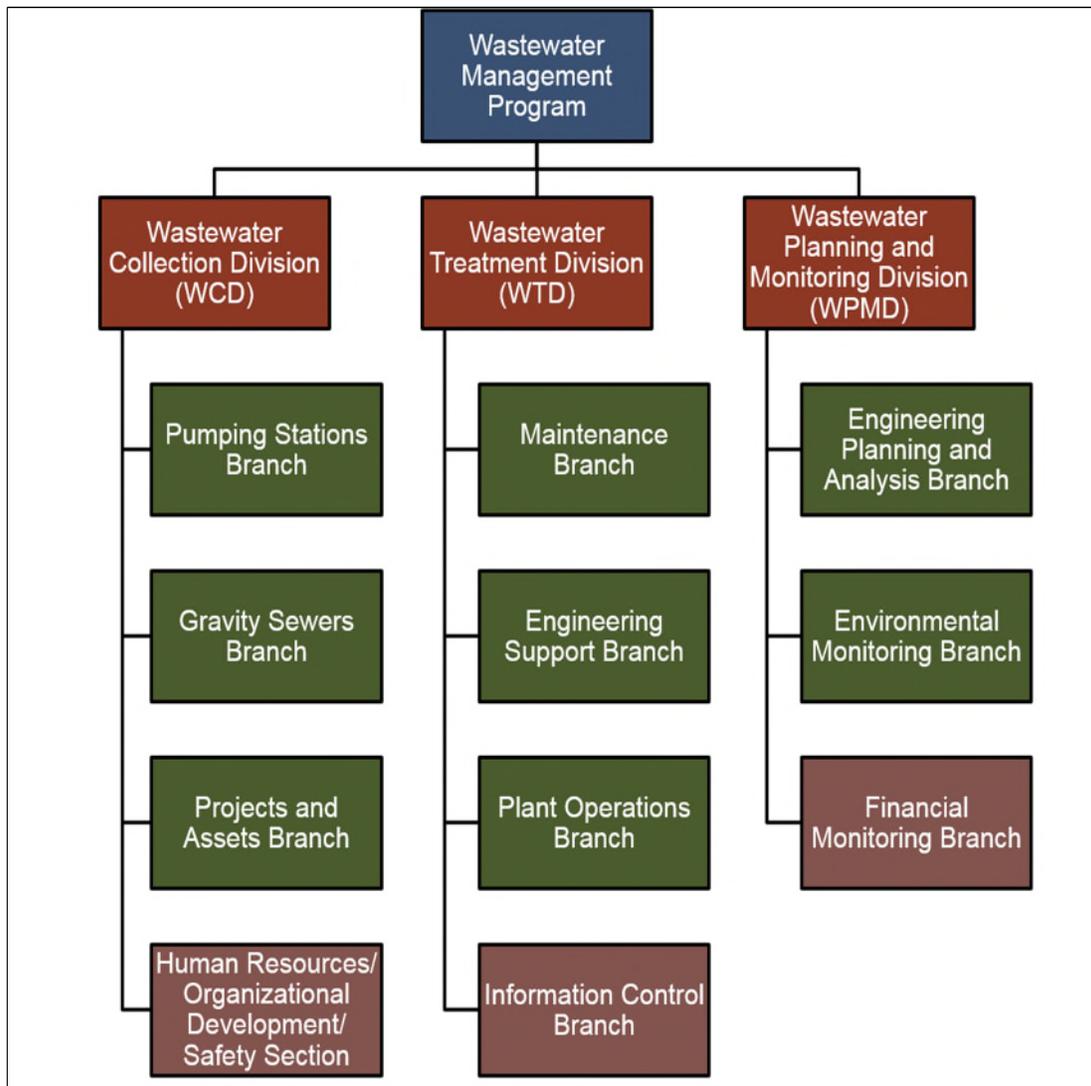
- **Wastewater Collection Division (WCD)** is responsible for the operation and maintenance of the sewers, force mains, pumping stations and metering stations.
- **Wastewater Treatment Division (WTD)** is responsible for the operation and maintenance of the Noman M. Cole, Jr. Pollution Control Plant facilities.
- **Wastewater Planning and Monitoring Division (WPMD)** is responsible for engineering planning and analysis, managing service agreements with nearby jurisdictions, financial management and planning, operation of the laboratory facility, public education outreach and administering the Industrial Pretreatment Program for the County.

The work within these Divisions is distributed amongst various branches, which are responsible for their assigned tasks and report to the Division Managers. As part of the overall integrated



program approach, there are two additional branches and one section that manage functions that affect the overall Program. These include the Financial Monitoring Branch, the Information Control Branch and the Human Resources (HR)/Organizational Development (OD)/Safety Section. Their functions are discussed in the following sections.

Figure 2-1: Organization of the Integrated Sewer System Wastewater Management Program





2.2 Wastewater Collection Division

2.2.1 Overview of Division

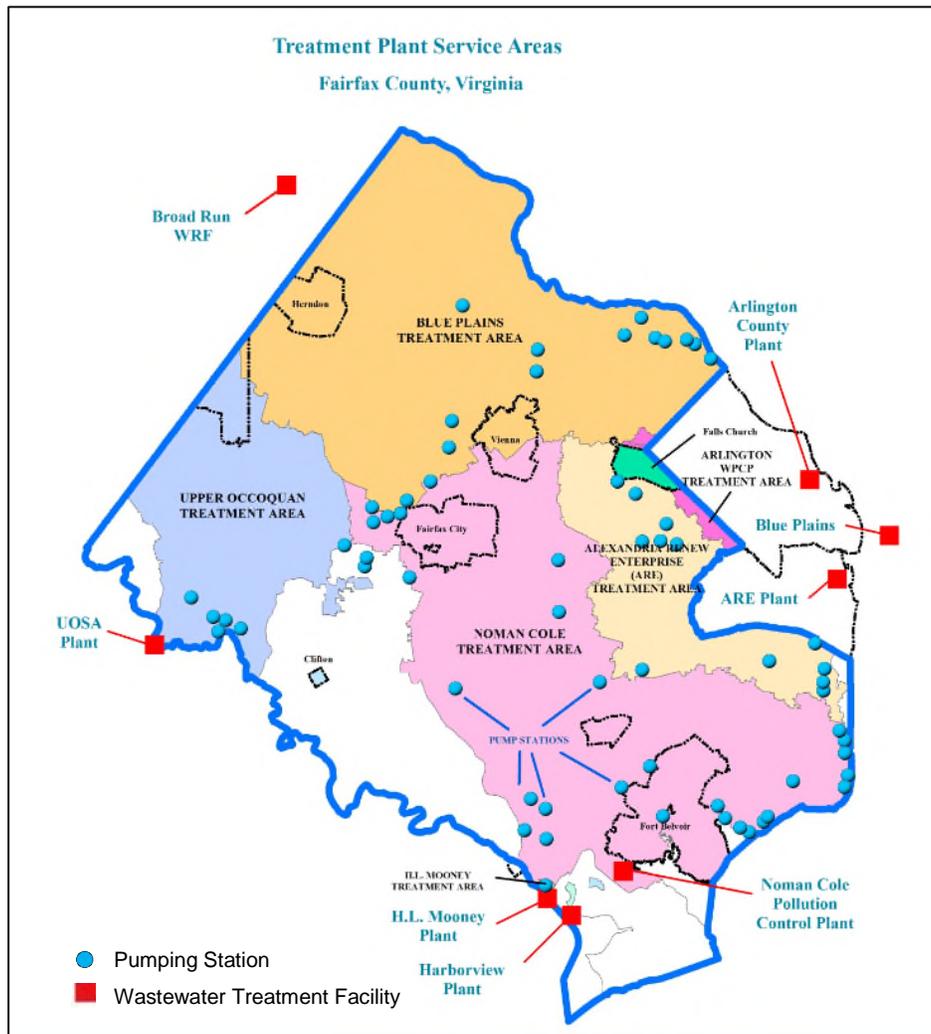
The Wastewater Collection Division (WCD) is responsible for the County's wastewater collection and conveyance system. The system consists of the following components:

- Approximately 3,390 miles of gravity sewers and force mains
- 63 wastewater pump stations as indicated in Figure 2-2
- 2 stormwater pumping facilities
- 1 water reuse system
- 57 flow metering stations
- 11 rain gauge stations
- 135 grinder pumps and associated pressure sewer systems
- Robert P. McMath Facility (Operations and Maintenance Headquarters)
- Two septage receiving facilities at Colvin Run and NMCCPCP

WCD had 132 permanent staff positions for FY 2015 with no change projected for FY 2016. Several positions were transferred from WCD to WPMD in FY 2014 in order to realign employees into the new organizational structure. All WCD employees work out of the McMath Facility in Burke, Virginia. The organizational structure of the WCD includes the Director's Office, Human Resources Section, and three branches: Gravity Sewers, Pumping Stations and Projects and Assets.



Figure 2-2: Treatment Plant Service Areas, Fairfax County, VA



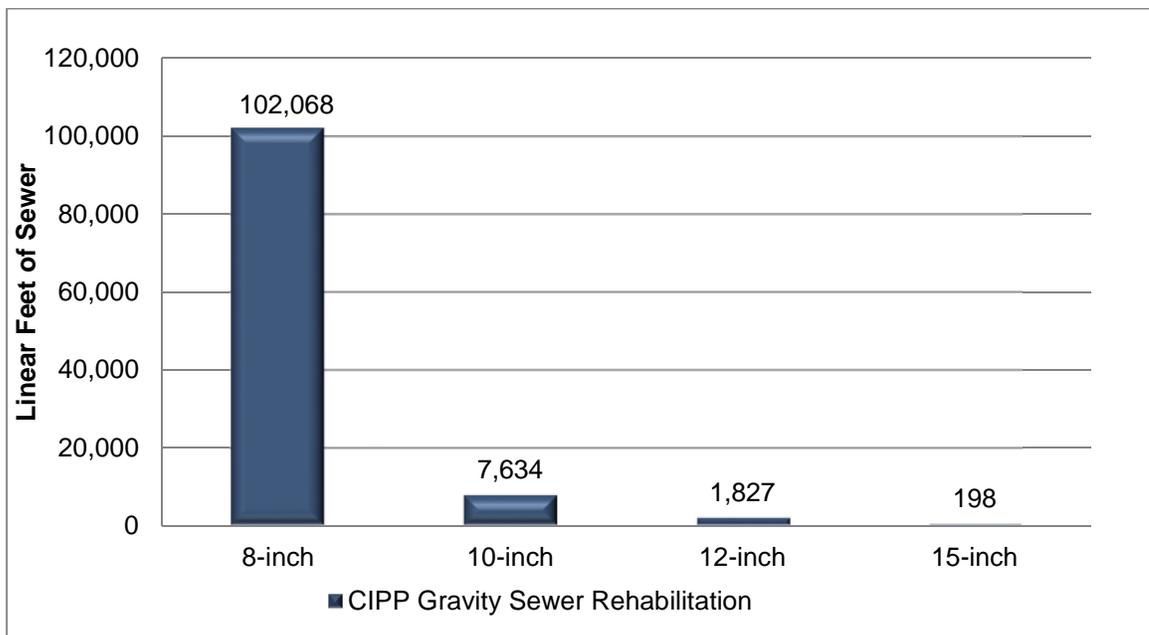
In March and April of 2016, Hazen and Sawyer met with the Branch Chiefs of the Gravity Sewers Branch (GSB), the Pumping Stations Branch (PSB) and the Projects and Assets Branch (PAB) to discuss the operation of the Division. The discussions focused on the Division's activities in FY 2015 and planned activities for FY 2016 and beyond, as well as the responsibilities and goals of each branch, and the organizational structure, operational and maintenance procedures, and available resources in place to meet those goals. The following initiatives and projects are representative of their activities this fiscal year.



2.2.2 Wastewater Collection Division Ongoing Initiatives

- **Sewer Rehabilitation:** WCD continues to utilize trenchless technologies for sewer rehabilitation. These technologies provide significant cost savings over traditional open cut repairs with the additional benefits of reduced disruption to citizens, the surrounding environment and traffic. For FY 2015, 111,727 linear feet of 8” through 15” diameter gravity sewers were rehabilitated using cured-in-place pipe (CIPP) repair. Figure 2-3 shows the linear feet of pipe by size and length that was repaired in FY 2015. It should be noted that approximately 86% of the County’s gravity sewer network is 8” diameter pipe.

Figure 2-3: Trenchless Sewer Rehabilitation Completed in FY 2015



- **Inflow/Infiltration (I/I) and Flow Monitoring Program:** The WCD in-house I/I and flow monitoring programs enable the Wastewater Management Program to be proactive in diagnosing problem areas. The I/I program has continued to focus on locating problem pipes in the system’s older sewer service areas, which are then addressed by the comprehensive sewer rehabilitation program. The flow monitoring program provides valuable data to determine problem areas and for billing of inter-jurisdictional flows. These data are utilized by WPMD to track the accuracy of their flow projections and to aid in determining treatment plant and collection system expansion needs. Continued focus has been on finding possible sources of I/I in the sewer service areas that may cause capacity



issues in the system. Additional I/I initiatives are focused on investigation in other sewersheds.

- **Closed Circuit Television (CCTV) Initiatives:** The Television Inspection Group continues its implementation of the EVI (Enhanced Visual Inspection) initiative. Under this initiative WCD's current process of manual-visual inspection of the County's gravity sewer system is being replaced with scanning technology WinCanVX to create robust, efficient, reliable and searchable video inspections. This initiative will enhance the reliability of the inspection program.
- **Standard Operating Procedure Updates:** In FY 2014 the Gravity Sewer Branch started to update and develop new Standard Operating Procedures (SOPs) to standardize routine maintenance activities in the field and response for emergency repairs. This initiative has continued in FY 2015 as more groups in the branch are participating. SOPs are also used as a form of institutional knowledge transfer as senior staff are responsible for developing the content. Currently 11 SOPs have been developed.
- **WCD Cross Training Initiative:** The WCD has implemented an internal cross training program that allows current division employees to become familiar with roles and responsibilities associated with different employment positions within WCD. A typical cross training session lasts for about one week and is implemented once an employee expresses an interest in a WCD position and after WCD management has a chance to establish the logistics of the cross training. The cross training is ongoing at all levels.
- **Lifecycle Asset Management Initiative:** In FY 2012, WCD began participating in Fairfax County's new program-wide strategic lifecycle asset management initiative for wastewater assets. The initiative focuses on total lifecycle asset management including: planning, funding, operation, management, inspection, maintenance, rehabilitation, renewal, disposal and performance measurement. A robust wastewater asset management program will improve the quality of wastewater service delivery to Fairfax County businesses and residents. The PAB is responsible for monitoring and recommending adjustment to the WCD's asset management strategies and objectives, minimizing wastewater collection and conveyance asset whole life cost, and maintaining acceptable level of service while managing risk associated with asset failure. Wastewater Collection Division Asset Management Team continues to have periodic strategy meetings.
- **NASSCO Certifications:** The National Association of Sewer Service Companies (NASSCO) sets standards for rehabilitation of underground utilities and has developed



comprehensive certification programs for pipeline, manhole, and lateral assessment. In an effort to standardize the evaluation of Fairfax County assets, thirty-one WCD staff members are trained and certified in NASSCO Pipeline Assessment and Certification Program (PACP), Manhole Assessment and Certification Program (MACP) and the Lateral Assessment and Certification Program (LACP). WCD encourages all staff involved with data collection, analysis, maintenance, and IT to obtain NASSCO certifications.

- **Flow Meter Automation:** The WCD flow metering program is a vital operation in monitoring and recording wastewater flows entering and leaving the County. The existing 57 permanent flow meters require monthly site visits to manually download flow data from the previous month. This data is then downloaded to the WCD data base for further analysis and reporting. In FY 2015, a wireless cellular system pilot study concluded that 3G communication technology would provide efficient and streamlined connection for flow monitoring. In FY 2016, WCD will replace outdated communication equipment in approximately 20 flow meter stations with new the 3G communication technology system.
- **Stream Crossing Initiative:** The GSB implemented a new stream crossing initiative since FY 2012. Under this initiative, the GSB teamed up with the County's Stormwater and Park Divisions to identify and locate exposed pipes situated along and/or across streams. Once identified by a project team member, the crossing is inspected, catalogued, and repaired or monitored as necessary. In FY 2015, 206 manholes were repaired and 9 pipes were protected or repaired in the vicinity of a stream crossing.
- **Supervisory Control and Data Acquisition (SCADA) Initiatives:** The WCD Supervisory Control and Data Acquisition (SCADA) system is vital to providing remote monitoring and has the capability of remote control of pump operation to all 63 wastewater pumping stations. The original SCADA platform was brought online in June 2006. Advances in technology and a growing need to operate the pumping station network more efficiently created an initiative to improve the current SCADA system. Several initiatives have been implemented to the vital SCADA system ensuring dependability and uninterrupted operation for many years to come:
 - Programmable Logic Controllers (PLC) and upgraded Human Machine Interface (HMI) screens have been installed as part of pumping station rehabilitations to provide user friendly graphics, monitoring and operation at the facility, and remote pump operation, ultimately providing a more reliable and efficient operating system. This initiative is ongoing as existing pump stations undergo rehabilitation.



- SCADA communication lines are being converted from Verizon to more advanced Cox Communication Metro Ethernet cables to provide a more reliable communication between the pumping stations and the Wastewater Collection Trouble Response Center. This conversion is scheduled for completion in FY 2016.
- In FY 2015, a cellular backup alarm system was implemented to provide continuous monitoring during inclement weather and to provide redundancy in the SCADA system. This redundancy not only provides for a more reliable monitoring system but also minimizes staff trouble calls to verify operations at pumping stations without SCADA communication.
- **APWA Accreditation Initiative:** As part of meeting the department-wide certification objective, WCD is taking an active role in providing operation and maintenance of gravity and pump stations/force mains, capital improvement projects, etc., information and standard operation procedures related to wastewater collection system. This initiative helps with succession planning as more and more employees joined the retirement population.

2.2.3 Pumping Stations Branch

The Pumping Stations Branch (PSB) is composed of three groups: Mechanical, Electrical and Instrumentation. The Branch is responsible for operation and maintenance of the County's sewage pump stations, low-pressure systems, flow meters, and the Robert P. McMath Facility. The preventive and corrective maintenance performed by the Branch is critical to reliable operation of the pump stations, the flow metering stations, and the Robert P. McMath Facility.

2.2.3.1 Pump Stations Operations

The PSB is responsible for the operation, maintenance, repair, and rehabilitation of the County's pump stations, meter stations, and force mains. Each day the staff, which includes engineers, industrial electricians, instrumentation technicians, and mechanical technicians, work to monitor, repair, and identify future projects associated with keeping these facilities in good working order. The pumping stations SCADA system provides remote monitoring, alarm management, and limited control capabilities for the pump stations on a Local Area Network (LAN). The system design is compatible with the SCADA system at the NMCPCP. The future goal is to integrate the systems into one secure Enterprise system.



The PSB is also responsible for identifying potential pump station upgrades and rehabilitation. The Branch identifies potential costs for rehabilitation projects and submits them for inclusion in the annual budget review and the Capital Improvement Program (CIP).

2.2.3.2 *Flow Metering*

The Instrumentation Group within the PSB, with support from ADS Environmental Services®, maintains the flow metering program. Flow metering responsibility includes monitoring and recording wastewater flows entering and leaving the Fairfax County sewer system for inter-jurisdictional billings, flow confirmation, and detecting extraneous I/I in the sewers.

The Instrumentation Group operates 57 permanent flow metering stations ranging in size from about 0.01 to 30 million gallons per day (mgd). Many of the 57 meters belong to other jurisdictions, but are maintained and calibrated by the Instrumentation Group. All flow metering stations in the Wastewater Management Program are equipped with ADS Environmental Services® flow metering systems. The Instrumentation Group is also responsible for 11 rain gauges throughout the County. This extensive flow metering and rain gauge network allows Wastewater Management to constantly monitor wastewater flows every 15 minutes and evaluate the sewer system's response to wet weather events.

In addition to the permanent flow meter stations and rain gauges, WCD has 30 battery-operated temporary flow meters. These "portable" meters can be installed in the collection system when needed to enhance I/I identification and reduction efforts. For example, nine temporary meters were installed in the Jones Point Sewer Shed in FY 2012 as part of a three-year study to collect I/I data to assist in pinpointing any I/I locations upstream of the Alexandria Renew Enterprises Water Resource Recovery Facility junction. The temporary flow meters in the Jones Point Sewer Shed will be removed in FY 2016. The Instrumentation Group and ADS Environmental Services® maintain and calibrate the meters regularly to ensure that they provide accurate and consistent flow data. Areas with major I/I issues are isolated and permanent flow meters are installed in these areas to monitor I/I.

2.2.4 Gravity Sewers Branch

The Gravity Sewers Branch (GSB) provides routine sewer cleaning, visual inspections, and maintenance of the 3,390-mile sanitary sewer system. For areas of Fairfax County that are not served by the sanitary sewer system (there are over 21,000 individual onsite sewage disposal systems outside of the approved sewer service areas through the County), the Wastewater



Management Program provides two septage disposal facilities in proximity to the majority of the existing septic systems (i.e., Colvin Run at the northern portion of the County and the NMPCPCP at the south end). These facilities also allow for disposal of grease produced by the County's food service establishments. The septage disposal facilities are connected to the collection system that conveys the waste for treatment at the NMPCPCP or the Blue Plains Advanced Wastewater Treatment Plant. The GSB is also responsible for managing the County's septage pump and haul operations.

2.2.4.1 Cleaning and Maintenance

The GSB's cleaning and maintenance program includes tracking, scheduling, and conducting routine inspection and/or cleaning of line segments. Staff adjust the cleaning frequency according to actual needs and inspect more problematic sewer lines at higher frequencies.

A total of 436 miles of sewer lines were cleaned and 10 miles visually inspected in FY 2015. The Branch anticipates cleaning 500 miles of the system in FY 2016. Greater efforts in sewer inspection and cleaning activities result in decreasing the number of preventable overflows and backups in the system. WCD determines the occurrences per 100 miles and uses it as one of the measured performance indicators. Table 2-1 shows the total number of occurrences (divided into backups and overflows) for the GSB in the last 5 years. Fairfax County gravity sewers have fewer occurrences of backups and overflows than the median level, established in a study conducted by the American Water Works Association and Water Environment Foundation (WEF) for all years, and was below the 25th percentile for each of the last five fiscal years. The general trend is that occurrences are infrequent events due to the County's aggressive maintenance and lining program.

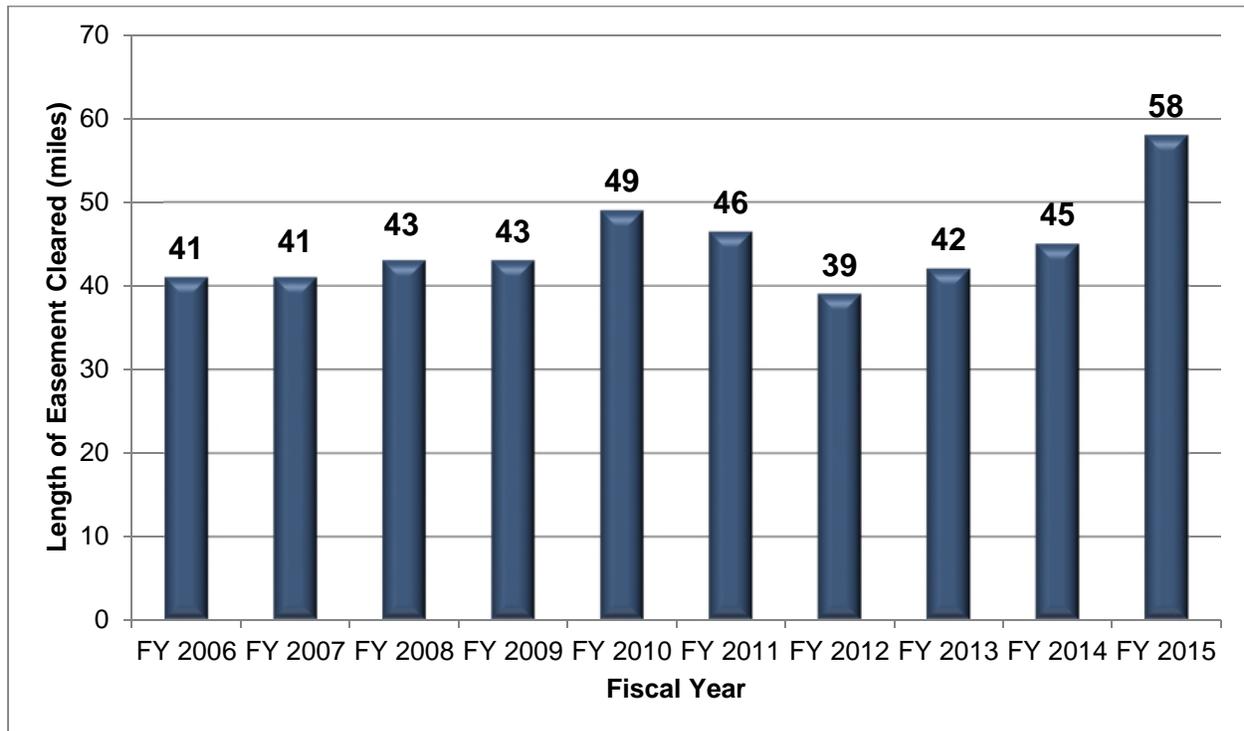
Table 2-1: Maintenance-Related Backups and Overflows in the Collection System

Fiscal Year	Backups	Overflows	Total Occurrences	Occurrences Per 100 Miles	WEF Median Per 100 Miles
FY 2011	15	18	33	1.00	4.3
FY 2012	10	9	19	0.58	
FY 2013	16	16	32	0.97	
FY 2014	15	21	36	1.09	
FY 2015	16	12	28	0.85	

A private contractor is used to clear sewer easements of small trees and brush to allow crews access for inspection and maintenance activities. A total of 58.13 miles were cleared in FY 2015. Figure 2-4 illustrates the total lengths of easement cleared in the past ten fiscal years.



Figure 2-4: Lengths of Sewer Easement Cleared



2.2.5 Projects and Assets Branch

The Projects and Assets Branch (PAB) is composed of four groups: Capital Projects and Asset Management, Pipe Rehabilitation, CCTV, and Miss Utility.

2.2.5.1 Capital Projects and Asset Management

The mission of the Capital Projects and Asset Group is to coordinate and oversee the planning, design, and construction of wastewater collection system capital improvement and rehabilitation/replacement projects in coordination with agency branches and outside agencies. The Group focuses on long-term capital project planning, budgeting, and asset management in order to identify and implement projects that ensure reliable operation and maintenance of Fairfax County wastewater collection infrastructure. The Group is responsible for verifying that projects are designed in a manner consistent with the Fairfax County Public Works Facilities Manual, the mission of WCD, WCD operations and maintenance procedures, workplace safety, and facility function. The Group coordinates with various agencies involved with projects to ensure that all



parties are satisfied with the outcome and the projects are completed as designed and within a specified schedule and budget.

2.2.5.2 Sewer Rehabilitation Group

The Sewer Rehabilitation Group is responsible for managing the rehabilitation of Fairfax County's sanitary sewer lines and manholes in an effective and efficient manner. The Group strives to rehabilitate gravity and force main sanitary sewer lines and manholes to maintain their structural integrity in order to eliminate I/I, prevent sanitary sewer backups and overflows, and prolong the life of the County's sanitary sewer system. The Group also performs quality control for all Enterprise Asset Management (InforEAM) system work orders and call centers and provide customer service to homeowners, plumbers, contractors and other County agencies.

2.2.5.3 Closed Circuit Television (CCTV)

The CCTV Group's primary function is to detect defects in the sanitary sewer system using specialized CCTV equipment and make repair recommendations. Once these defects are identified, recommendations for their repair are made. The Group inspects older sewer lines for possible infiltration, deterioration, structural integrity, and any blockage that may lead to sewer overflows or backups. Once an overflow or sewer backup has occurred, inspection equipment is dispatched to determine the cause of the event and recommended solutions are provided by the staff to prevent recurrence of the overflow or backups. The Group is also responsible for inspecting all new sanitary sewer lines. Using the guidelines set out in the Fairfax County Public Facilities Manual, inspectors ensure that only properly constructed sewer lines and manholes are accepted into the County's sewer system.

2.2.5.4 Miss Utility

The Miss Utility Group locates and marks Fairfax County's sanitary sewers and water reuse lines in accordance with the Virginia Underground Utility Damage Prevention Act and the rules and guidelines set forth by the State Corporation Commission (SCC). The service is provided to ensure that no damage occurs to Fairfax County's sanitary sewer and water reuse lines during any excavation in which there is a valid Miss Utility request. In FY 2015, the Group processed 138,076 Miss Utility requests, a 4.71% decrease over FY 2014 numbers. Of the total number of Miss Utility requests processed in FY 2015, 33,579 required field locates, a 3.88% decrease over FY 2014. To accomplish their tasks, the Miss Utility Group uses specialized ticket screening software called TelDig Utility.



2.2.5.5 Wastewater Collection Division Capital Projects

The following tables provide a summary of capital improvement projects that are in the study or design phase or are expected to start construction between FY 2014 and FY 2016. Funding level details for each type of project including pumping stations, sewer metering, collection system replacement and rehabilitation, and the sewer sag program are provided in Section 4.5.3. Table 2-2 provides a summary of gravity sewer projects, Table 2-3 provides a summary of pumping station projects, and Table 2-4 provides a summary of miscellaneous projects completed by WCD. The timing and funding of projects presented in the CIP appear adequate.

Table 2-2: Gravity Sewer Projects

Status	Facility	Description of Work
<p style="text-align: center;">Under Study/Design in FY 2014- FY 2016</p>	<p>Sewer Capacity I/I Improvements</p>	<p>Investigate and study of houses in the Lagrange, Loisdale and Schaffer Road area for Private I/I to Sewer System was completed in FY 2015. Rehabilitation of identified manholes is complete and the rehabilitation of manholes at Lake Barcroft is anticipated to be completed in FY 2016.</p>
	<p>Sewer Capacity Improvement Fold & Form (F&F) and Sliplined sewers</p>	<p>Rehabilitation of 1,581 sewer segments F&F/sliplined in the 1990s; including condition assessment and recommendations. CCTV inspection reports and other data collection was completed for 476 sliplined segments in FY 2015. The criteria for condition assessment and matrix will be developed and completed in FY 2016.</p>
	<p>Sluice Gate Rehab/Odor Rehabilitation at Scotts Run and Carderock.</p>	<p>Design of the rehabilitation of the sewer junction structure and odor control system is completed. Obtained the power sharing agreement between WCD and National Park Service (NPS). Legal department of NPS and County Attorney's office completed the review of Power Sharing Agreement and preparation for bid Documents started in FY 2015, before construction starts in FY 2016.</p>
	<p>Condition Assessment, Cleaning and Improvements of Large Diameter Sewers</p>	<p>Preliminary Engineering Report (PER) documenting the condition assessment of large diameter sewers including evaluation using NASSCO's pipeline assessment and recommendation for rehabilitation and cleaning. Condition assessment and criticality criteria is being established. The sub-consultant has started to assess the conditions in the field and it is ongoing for the selected sewer shed. CCTV inspection reports and other data collection was ongoing for 1030 Large diameters segments in FY 2015 and 2016. The criteria for condition assessment and matrix will be developed in FY 2016.</p>



Status	Facility	Description of Work
	Sewer Capacity Improvements Sewer Sags Evaluations.	Prevent overflow, improve capacity of sewer segments and minimize I/I by improving the structural conditions of sewer under repair/rehabilitation (R/R) program. The PER for 157 sewer sag segments was completed in FY 2015. The first sewer sag segment at Little Hunting Creek will be designed for rehabilitation in FY 2017.
	Colvin Run Septage Study	A study to rehabilitate the existing Colvin Run Facility or relocate to other location in County is ongoing in FY 2015 and FY 2016.
	Odor Improvements to the Lincoln-Lewes-Vennoy (LLV) Pressure Sewers	Investigate odor control alternatives and provide recommendations. Engineering services will be taken off hold upon completion of VX456 Odor control chemical pilot study, which is anticipated to be completed in FY 2016.
	Accotink Trunk Sewer Lining Project.	CIPP lining of 36-, 42-, and 48-inch gravity sewer inside the NMCPCP. The project also includes rehabilitation of manholes and other structures. The construction contract is anticipated to be awarded in FY 2016.
Under construction in FY 2014- FY 2016	Adult Detention Center Grinder System	Installation of a sewer grinder system at the Adult Detention Center. Design was completed in FY 2014 and construction will be completed in FY 2016. WCD will be responsible for the maintenance of this grinder through FY 2017.
	CIPP Rehabilitation	Ongoing CIPP rehabilitation of gravity sewers and manholes in FY 2015.
	Holmes Run Emergency Rehabilitation	Emergency rehabilitation of approximately 3,000 sanitary sewer lines using CIPP method. Bypass pumping deployed during the lining process. Lining completed in FY 2015.
	Colonial Avenue Sewer Rehabilitation, Located in Mount Vernon District	Rehabilitation scheduled for FY 2016. Study and design appropriate rehabilitation of 3,425 feet of 36-inch sewer line. Project bid and lining expected to begin in FY 2016.
	Dead Run Force Main Rehabilitation	Due to the high cost of replacement the force main will be lined. Construction will begin in FY 2016.
	Holmes Run Diversion Structure #417	In FY 2014, analysis of the diversion chamber to prevent SSOs was completed. The recommended work consisted of installation of new adjustable weir with alarms and signals. Construction is anticipated to be completed in FY 2016.
	Little Hunting Creek and Accotink PCCP Force Main Analysis	Preliminary investigation of the condition of 0.86 miles of 30-inch, 1.26 miles of 42-inch PCCP force main using electro-magnetic inspection by Pure Technology US Inc. Spot repair design of Force Main started in FY 2014 and completed in FY 2015. Repair of LHC and Accotink Force main is anticipated to start in FY 2016.



Status	Facility	Description of Work
	South Van Dorn Sewer Repair	Emergency replacement of sagged sewer segment which crosses Backlick Run and railroad tracks. Design completed in FY 2015. Construction and site restoration is anticipated to be completed in FY 2016.
	Lake Thoreau Sewer Sag Repair	Emergency replacement of 183 LF of 20-inch diameter DIP sewer that buckled across Lake Thoreau because of the straps on the piers deteriorated. The replacement is expected to be complete in FY 2016.
	Dolphin Lane Project	In house design to relocate existing sewer lines that run under a swimming pool. Efforts to acquire the additional easement for sewer relocation is ongoing and construction is expected to start in FY 2016.

Table 2-3: Pumping Station Projects

Status	Facility	Description of Work
Under Study/Design in FY 2014- FY 2016	Dead Run Pump Station	Improvements to minimize confined space areas in the pump station. Design contract executed in May 2014. The design completed in FY 2015 and the construction ongoing in FY 2016.
	Giles Run Pump station Rehabilitation	Rehabilitation and system upgrades of the mechanical, electrical and instrumentation system. Design is expected to be completed in FY 2016.
	Six Pump Station Preliminary Engineering Review.	Preliminary review of six Smith & Loveless packaged pump stations. Notice to proceed was issued in FY 2012. Design completed in FY 2015 with anticipated construction starting under JOC contract in FY 2016.
	Pump Station Fuel Tanks – Fire Marshall Permitting	The inspection and Fire Marshall permitting of 51 pump stations with above and underground fuel tanks. The site inspection and permitting will be completed in FY 2016.
Under construction in FY 2014- FY 2016	Belleview Pump Station 1413A Belleview Boulevard, Alexandria, VA	Rehabilitation and system upgrades of the mechanical, electrical and instrumentation system with a capacity of 2.35 mgd. Construction started in FY 2015 and substantially completed in FY 2016.
	Difficult Run Pump Station and Force Main 9950 Colvin Mill Road, Great Falls, VA	Preliminary Engineering Study to determine required improvements and costs to upgrade existing pumping station and force main to a capacity of 12 mgd has been completed. Design of the pump station and condition investigation of the Force Main was completed in FY 2015. The pump station construction will begin in FY 2016. The Force Main construction is anticipated to bid in FY 2016.
	Dead Run Force Main 6925 Georgetown Pike, McLean, VA.	Re-lining of approximately 2,700 LF of 14" cast iron force main. Design was completed in FY 2015 and lining of force main to begin in April 2016.



Status	Facility	Description of Work
	Accotink Creek Switchgear 9201 Richmond Highway, Fort Belvoir, VA, Freund House Switchgear 5404 Old Mill Road, Alexandria, VA	Replacement of existing electrical switchgear and primary breakers. Construction started in April 2015 and anticipated to be ongoing in FY 2016.
	Generator Rehabilitation	Replacing the generators along with electrical switches at 13 pump stations. The project construction under JOC contract started in FY 2014 and will be completed in FY 2016.
	50/66 Main Pumping Station: 11633 Random Hills Road, Fairfax, VA.	Rehabilitation and system upgrades of the mechanical, electrical and instrumentation system with a capacity of 2.95 mgd. Construction was completed in FY 2015.
	F Street Pumping Station: 1400 Belle Haven Road, Alexandria,	Rehabilitation and system upgrades of the mechanical, electrical and instrumentation system with a capacity of 9 mgd. Construction was completed in FY 2015.
	Accotink, Little Hunting Creek, Freund House Emergency Force Main Connection:	Installation of onsite emergency force main connection. Design of Emergency bypass at Little Hunting Creek and Accotink Creek was completed in FY 2014. Design of the Little Hunting Creek emergency bypass still ongoing in FY 2015. The construction of emergency bypass system at two remaining pump station is anticipated to start in FY 2017.

Table 2-4: Miscellaneous Projects

Status	Facility	Description of Work
Under Study/Design in FY 2014- FY 2016	Flow meter Vaults Rehabilitation	Evaluation of 60 meter vaults for structural, electrical and mechanical deficiencies. The PER is expected to start and complete in FY 2016.
	Holmes Run Odor control Demonstration/Study	Odor control pilot study to determine the dosage of chemical required for adequate odor control. The project is anticipated to start and conclude in FY 2016.
	Odor Control Chemical Tanks Installation Project	Once the appropriate dosage of Bioxide® is determined from the Odor Control Demonstration/ Study, a permanent tank structure will be placed at the Holmes Run pump station. Bioxide® will be fed into the station as a means of odor control.
Under Construction in FY 2014- FY 2016	Pump Station Fall Protection Phase I & II Improvements at 19 Pump Stations	Additional fall protection measures at entry points to the wet wells and vaults. Investigation and improvements are ongoing at many pump stations. Phase I construction was completed in FY 2014. Phase II Protection measures at 16 more pump stations started in FY 2014 and will be completed in FY 2015.



Status	Facility	Description of Work
	Pump Station Fall Protection Phase III Improvements at 16 Pump Stations	Additional fall protection measures at entry points to the wet wells and vaults at 16 pump stations. Construction is expected to be completed in FY 2016.
	Pump Station Fall Protection Phase IV Improvements at 17 Pump Stations	Additional fall protection measures at entry points to the wet wells and vaults at 17 pump stations. Construction is expected to be completed in FY 2016.

2.2.6 Wastewater Collection Division Safety and Staff Development

The WCD continues forward with an admirable safety record. In FY 2015, the WCD continued the fall protection and permit required confined space infrastructure improvement project. This project, which was initiated in FY 2013 at County wastewater pumping stations, is expected to be completed in FY 2017. These infrastructure improvement initiatives included installation of railing systems, floor guards and fall protection tie-off points (to mitigate fall hazards) and permanently mounted steel bases (to work in coordination with confined space entry equipment) at all pumping stations. Total cost for improvements is approximately \$1,738,000. All levels of WCD staff worked in a concerted effort to finalize the onsite infrastructure improvements, secure the funding vehicle, and meet with the selected contractor to discuss the modifications required.

In FY 2015, the WCD also continued with usual and customary safety tailgates, meetings and other educational events for both new and veteran employees. Topics addressed included lockout/tag out, permit-required confined space entry, powered industrial trucks, traffic and flagging safety, and more. Additional information on the County’s safety program can be found in Section 2.7 of this report.

2.2.7 Wastewater Collection Division Facilities Inspection

Robert P. McMath Facility

All WCD administrative offices and maintenance shops are located in the Robert P. McMath Facility, 6000 Fred’s Oak Road in Burke, Virginia. The facility serves as a staging area for WCD operations and is also used for equipment storage (with the old Upper Cub Run wastewater plant site providing additional storage area). Although well maintained, the facility is approximately 30- years old. Rehabilitation projects were completed in FY 2013 and FY 2014, and no new projects were completed in FY 2015.



Pumping Stations

On April 5, 2016 Hazen and Sawyer conducted site inspections to assess the general condition and operability of four pump stations. The PSB provided a summary of all the pump stations with the location, capacity, date of original construction and date of major rehabilitation or modification. Hazen and Sawyer used this information to select four pump stations with the objective of inspecting pump stations that represent the wide range of assets maintained by the WCD. A summary of ongoing, proposed or recently completed projects and observations from the inspections are provided below:

- Wesley House Pump Station
 - Installation of new generators completed in FY 2015
 - Installation of safety railing around wet well completed in FY 2015
- Holmes Run Pump Station
 - Bioxide® Odor Control Pilot
- Belle View Pump Station
 - Rehabilitation complete in FY 2016
- Little Hunting Creek Pump Station
 - Scheduled for rehabilitation, design will commence in FY 2017
 - Two VFDs and pumps installed in FY 2016 in advance of more comprehensive upgrades

Figure 2-5 through Figure 2-10 present photographs taken during the site visits to the various pumping stations. All of the pump stations that were visited are well-maintained and continue to reflect WCD's superior approach to operations and maintenance.



Figure 2-5: New Generator at Wesley House



Figure 2-6: Bioxide® Pilot Trailer at Holmes Run



Figure 2-7: New Grinders at Belle View



Figure 2-8: New Pumps at Belle View



Figure 2-9: Little Hunting Creek Pump Motors



Figure 2-10: Little Hunting Creek Switchgear





Flow Monitoring Stations

On April 13, 2016 Hazen and Sawyer conducted site inspections for four flow monitoring stations to assess their general condition and operability. The PSB provided a summary of Fairfax County flow monitoring stations with the location, capacity, and type of flow monitoring device installed. Hazen and Sawyer used this information to select four flow monitoring stations with the objective of inspecting flow monitoring stations that represent the wide range of assets maintained by the WCD. A summary of observations from each metering station is below:

- Sugarland Road
 - Flume with ultrasonic sensor
 - No ongoing projects
- Great Falls
 - Solar powered
 - Flow measurement interference reported due to grit and debris settlement
- Tod Street
 - The panel exterior is degraded
 - Flow meter vault requires traffic control to access
- Glen Forest
 - 3G technology communication equipment upgrades planned

Figure 2-11 through Figure 2-16 are photographs taken during the site visits to the various metering stations. All of the metering stations that were visited are well-maintained and continue to reflect WCD's superior approach to operations and maintenance.



Figure 2-11: Sugarland Road Metering Station



Figure 2-12: Sugarland Road Flume



Figure 2-13: Great Falls Metering Station



Figure 2-14: Great Falls Ultrasonic Sensor



Figure 2-15: Tod Street Metering Station



Figure 2-16: Glen Forest Metering Station





2.3 Wastewater Treatment Division

2.3.1 Overview of Division

The Wastewater Treatment Division (WTD) operates and maintains the County's Noman M. Cole, Jr. Pollution Control Plant (NMCPCP) located in Lorton, Virginia. The staff at the plant is organized into four branches: Engineering Support, Operations, Maintenance, and Information Technology. WTD had 137 positions in FY 2015 that will be maintained and there are 137 positions budgeted for FY 2016.

All four branches of WTD work to continually and effectively treat wastewater and produce a high quality treated effluent meeting all Virginia Department of Environmental Quality (DEQ) permit requirements. WTD also oversees the Water Reuse Project which produces Level I reclaimed water for irrigation and industrial uses in the County.

Major upgrades, initiatives and compliance items performed this fiscal year include the following:

NMCPCP Upgrades

- **Ash Handling Improvements:** The ash handling system at the incinerator facility required improvements. Design for improvements related to equipment replacement and maintenance needs started in FY 2011 with design completed in FY 2013. Construction was completed in FY 2015.
- **Biosolids Program (Solids Stabilization and Disposal):** The Biosolids Program continued in FY 2015. Currently there are three phases in progress. Phase 1 includes Replacement of the Venturi Scrubbers on the incinerators to provide compliance with new air maximum available control technology (MACT) requirements going to into effect March 2016. This project started construction in FY 2014 and is expected to be completed in FY 2017. The second phase, the Interim Biosolids project, consists of rehabilitation and improvements to infrastructure identified to be in need of immediate work due to condition and safety considerations. The work includes rehabilitation of the thickened sludge storage and mixing equipment, odor control facilities, and lime conditioning facilities. Design continued in FY 2015 and construction is expected to start in FY 2017. The third phase of the program focuses on the rehabilitation of the existing incineration system, supporting biosolids processing infrastructure and, potentially, energy recovery from a thermal combustion processes. The preliminary design work was completed in FY 2015 and construction is expected to commence in FY 2018.



- **Primary and Secondary Process Rehabilitation:** A comprehensive evaluation of primary and secondary processes is planned for FY 2016, including the flash mix tank, primary settling tanks, activated sludge process, secondary clarifiers, aeration facilities, and associated chemical addition facilities for a 30-year planning horizon for flows up to 80 mgd. The design is scheduled to begin in FY 2017 and is anticipated to include rehabilitation and/or modification of existing facilities to renew service life and reduce risk, and construction of new facilities to meet the current and future needs of the process. Construction of this project is scheduled to begin in FY 2020.
- **Motor Control Center and Distribution Center Replacement:** This project includes replacement of fifteen of the 480V distribution centers and twenty of the motor control centers throughout the facility. The project will reduce arc flash exposure risk, improve safety, and reinvest in the existing electrical equipment. The project is currently in the design phase with projected completion in FY 2016. Construction is projected to start in FY 2016 and to be completed in FY 2021.
- **Backup Power Reliability Improvement:** The new backup generator system is being installed to increase the reliability and flexibility of the standby backup power system. Construction was started in FY 2010 and the project will be completed in FY 2016.
- **Raw Wastewater Pump Station Rehabilitation:** This project involves the evaluation and infrastructure renewal of raw wastewater pumping at the facility, including two existing pump stations, underground infrastructure, associated processes and systems. Design of this project will commence during FY 2016 and will proceed through FY 2018. Construction is scheduled for FY 2019 through FY 2021.
- **Disinfection Rehabilitation:** The existing chlorine disinfection system will be replaced with a UV Disinfection system. The project design includes a new outfall pipe, new backwash pump station, new APW pump station, and new water reuse pump station. Design will commence in FY 2016. Project construction will be executed under a Construction Management at Risk (CMAR) contract, and is planned for FY 2018 through FY 2021.
- **Tertiary Clarifier Project:** This project includes the rehabilitation of the existing tertiary clarifier system to improve safety and process reliability and also to reinvest in the infrastructure to ensure continued permit compliance and operation. The tertiary clarifiers chemically remove phosphorus to help the facility meet the existing phosphorus



concentration and annual mass loading limits. Construction on the Tertiary Clarifier Project began in FY 2011. The project is expected to be completed in FY 2017.

- **Grit Building Rehabilitation:** Construction activities related to the rehabilitation of the sludge screening and degritting building were successfully completed in FY 2015.
- **Filter Rehabilitation:** The media and underdrains of the mono-media (“FF”) and the multi-media (“DD”) gravity filters are in need of rehabilitation as are numerous other components of the filtration system including valves, meters, electrical systems, building HVAC and backwash systems. This rehabilitation was scheduled to begin design in FY 2013 with phased design and construction beginning in FY 2014 and spanning through FY 2020. Phase 1 includes the rehabilitation of the “DD” filters and the backwash pump station (i.e. the “EE” pump station). Design of the improvements began in FY 2013 and construction is expected to start in FY 2016. Phase 2 includes filter media replacement and repair of the underdrains in the “FF” filters. This work is being done in-house by plant staff with construction beginning in FY 2013 and ending in FY 2014. Phase 3 includes the design of new “FF” filters and is expected to begin in FY 2018 with construction beginning in FY 2021.
- **Facility Space Optimization Program:** Preparation of a detailed needs assessment and master plan for nine non-process buildings, workspaces, access roads and warehouses will commence in FY 2016. The master plan will prioritize implementation of future facility space rehabilitation and replacement.
- **Equalization Basin Rehabilitation:** The intent of this project is to improve the safety, structural integrity, operability and functionality of the existing equalization basins and their ancillary pumping facilities.
- **Pohick Creek Stream Stabilization Project:** The NMCPCP is located along the Pohick Creek floodplain and 100-year flood elevation encroaches on the southern portion of the site. This project will provide additional flood protection via retaining walls and will also stabilize and restore Pohick Creek as it follows the perimeter of the Plan.

Administrative Initiatives

- **Performance Measure Tracking:** WTD continues to track operating costs (dollars per million gallons), odor complaints and compliance with permitted effluent discharge limitations. The Division benchmarks against its own performance record and other comparable advanced wastewater treatment plants in Northern Virginia. The unit cost of



wastewater treatment at NMCPCP was \$1,542 per million gallons in FY 2015. This is the lowest unit cost of any advanced wastewater treatment plant in Northern Virginia.

- **Operations/Maintenance Workforce Planning:** Senior staff succession planning and knowledge transfer of institutional knowledge continues to be a focus of WTD. In FY 2015 dual incumbency activities continued, 25% of staff moved into new positions and there were 15 internal promotions. This demonstrates WTD's success in planning and developing the competencies of employees to be ready for new higher level technical positions.
- **Professional Licensure and Certifications:** WTD staff have a wide range of skill sets and expertise and many positions require a professional license or certification. In FY 2015 over 100 professional licenses and certifications were held by WTD. Staff are encouraged to obtain additional new certifications as part of the workforce planning initiative.
- **Energy Savings:** In FY 2015, the WTD participated in a load shedding/curtailment program that resulted in a load curtailment of 1,781 KW (from the Energy Connect Website) and revenue of \$13,000 (Energy Connect Website).
- **Asset Management:** Asset management continues to be a focus area for WTD and the Wastewater Management Program in general. WTD manages rehabilitation and replacement of most of its assets in-house with internal resources. A new Asset Management Team (AMT) was formed in 2014. The AMT is composed of representatives of all sections within the WTD and meets monthly to provide input to the Asset Management program. Starting in FY 2016 the asset electronic database will be updated to reflect the physical changes that were made when assets were added, replaced, or rehabilitated as part of Capital Improvement Program (CIP) projects or assets repaired as part of an in-house maintenance activity. WTD is tracking its monthly maintenance cost using the electronic database to optimize the available resources. The plant is also continuing to rank and performance test the numerous pumps onsite for efficiency to identify the most economical means to convey wastewater throughout the facility. These results are integrated in the Capital Improvement Planning process and helps guide infrastructure renewal strategies and decisions.

Regulatory/Compliance Items

- **Environmental Management System (EMS):** In FY 2010, WTD obtained Extraordinary Environmental Enterprise (E4) status from VA DEQ's Virginia Environmental Excellence



Program (VEEP), which is the highest level of achievement. It indicates a fully implemented EMS program that is audited by a third party. This status is applicable for three years and was reapplied for and received in FY 2013. In FY 2015, WTD continued its EMS program. An audit of the EMS program is scheduled to occur in FY 2016.

- **Training:** Increasing operator competency and certification levels through training continue to be goals of WTD. As of June 2015, there were 46 certified plant operators at the NMCPCP. Continuing education and training for plant operations staff have been emphasized in the past year through the use of both on-site and off-site training programs. The computer-based training center in the Administration Building allows all computer-based training to be conducted in-house. Specialty training to maintain competency in specific skill areas is also provided. The NMCPCP training manual is continually updated.
- **Waste Load Allocation:** In calendar year (CY) 2015, WTD met its waste load allocations for Total Nitrogen (TN) and Total Phosphorus (TP). As a result of the MBBR facility coming online, the facility observed an annual TN discharge load of 239,530 pounds, the allocated load was 612,158 pounds. The facility discharged an annual TP load of 5,615 pounds, allocated load was 36,729.
- **Nutrient Credit Sale:** In CY 2015, the plant sold 372,628 pounds of total nitrogen credits on the Virginia nutrient exchange for \$104,533. In CY 2015, the plant sold 31,114 pounds of total phosphorus credits on the Virginia nutrient exchange for \$36,252.
- **Sewage Sludge Incinerators (SSI) Maximum Available Control Technology (MACT) Air Emission Regulations:** In FY 2011, the Environmental Protection Agency issued new air emission regulations for sewage sludge incineration units. These new regulations included reduced concentration levels for particulate matter, hydrogen chloride, carbon monoxide, dioxins/furans, mercury, oxides of nitrogen, sulfur dioxide, cadmium and lead. These reduced levels are required to be achieved at all times and monitored to ensure compliance. Fairfax County implemented interim air pollution control measures to ensure compliance with this requirement in FY 2013 and is in the process of installing permanent air control pollution measures. This work is expected to be completed in FY 2016, after which a new Title 5 Air Permit will be issued. The WTD is training staff on new reporting requirements and ensuring that staff has proper certifications for operation and maintenance.



- **Safety/OSHA:** In FY 2015, WTD had a total of 74 unsafe conditions identified and corrected and 3 lost time accidents. A total of 190 safety training sessions were presented to plant staff.

2.3.2 Engineering Support Branch

The Engineering Support Branch (ESB) provides process guidance and engineering support related to regulatory compliance, management and implementation of capital improvement programs throughout the plant, and other cross-branch services such as emergency response, safety and security.

Highlights of ESB activities started and completed in FY 2015 and those planned for FY 2016 include the following:

- **Reporting:** Managed regular monthly, annual and semi-annual reporting for FY 2015 as well as specialized testing and regulatory activities associated with upcoming MACT requirements, the new generator system, and changes in the facility's industrial stormwater permit.
- **Underground Utilities:** Implementation of a project to create a comprehensive AutoCAD file of underground utilities at the NMCCPCP. In FY 2015, ESB lead a multi-group team in the location, identification, and marking of underground valves at the facility. A process was set up to integrate the information into the facility's integrated asset management program. The effort focused first on County water valves, followed by advanced plant water (APW) valves. The work will continue through FY 2016.
- **Drawing library:** Continuance of an ongoing effort, started in FY 2012, to organize, scan and catalogue all NMCCPCP project drawings (over 500 sets). During FY 2015, 500 drawing sets were audited for completeness and accuracy, unnecessary drawings were retired from the library.
- **Master Plan update:** The initiative to update the 2009 master plan was completed in FY 2015. Results have been integrated in the FY 2017 CIP budgeting process.

2.3.3 Operations Branch

The Operations Branch is responsible for the daily operation, monitoring and control of the liquid process, solids processes, residuals disposal, and reclaimed water production at the NMCCPCP on a continuous (24/7) basis. Included in these responsibilities are sampling; process monitoring and control; record keeping and reporting; in-house operator training; reviews of engineering



planning and design projects; treatment system project planning; and coordination with consultants on design, construction activities and start-ups.

In FY 2015, the NMCCPCP consistently produced a high quality effluent which exceeded the effluent discharge permit requirements as shown in Table 2-5 and Figure 2-17. There were no effluent discharge violations during the period. In 2013, the NMCCPCP was recognized by the National Association of Clean Water Agencies (NACWA) with the Platinum 15 Award for 100% compliance with its Virginia Pollutant Discharge Elimination System (VPDES) discharge permit limits on a calendar year basis. NMCCPCP has received this award for the past sixteen consecutive years. There are only 28 of the 16,000 wastewater treatment plants in the United States that have received this award. WTD continues to be a leader in protecting the Chesapeake Bay and considers maintaining this status an important initiative for FY 2015.

Table 2-5 provides a comparison of the permit limits and the actual monthly average discharge concentrations for key effluent discharge parameters in FY 2015. Figure 2-17 presents monthly average discharge concentrations for key regulated parameters. NMCCPCP operates an enhanced nutrient removal process which continues exceed the required nutrient removal loads and acts as a revenue source as nutrient credits are sold on the Virginia Nutrient Exchange.

Table 2-5: FY 2015 Discharge Limits and Annual Average Discharges

NMCCPCP Effluent Characteristic	Discharge Limits	Annual Average
Flow	67 mgd	38.4 mgd
5-day Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	5 mg/l	2 mg/l
Total Suspended Solids (TSS)	6.0 mg/l	0.7 mg/l
Total Nitrogen (TN) ⁽¹⁾	3.0 mg/l	2.09 mg/l
Total Phosphorus (TP)	0.18 mg/l	0.06 mg/l
Ammonia-Nitrogen (NH ₃ -N)		
Summer (April - October)	1.0 mg/l	0.1 mg/l
Winter (November - March)	2.2 mg/l	0.1 mg/l
Total Phosphorus (TP)	0.18 mg/l	0.06 mg/l
Dissolved Oxygen (DO)	>6.0 mg/l	8.61 mg/l
pH	6.0 - 9.0	7.0
<i>Escherichia Coliform</i> ⁽²⁾ – Monthly geometric mean	126/100 mL	1/100 ml

⁽¹⁾Total nitrogen effluent limits are based on calendar year mass loading. Reductions in the effluent TN limit (from 7 mg/L to 3 mg/L) took effect in January of 2015.

⁽²⁾ Measured as monthly geometric mean.

NMCCPCP is authorized to produce and distribute up to 6.6 mgd of Level 1 Reclaimed Water as regulated under 9VAC25-740 for industrial and irrigation purposes in Fairfax County. The



operations staff is responsible for monitoring all components of the treatment and distribution system and ensuring that reclaimed water meets or exceeds the minimum treatment standards listed in Table 2-6. In FY 2015 Fairfax County produced 1.32 mgd of reclaimed water for use at the Covanta Energy Facility, Lower Potomac Public Park, and the Loral Hill Golf Course.

Table 2-6 Treatment Standards and Production of Level 1 Reclaimed Water

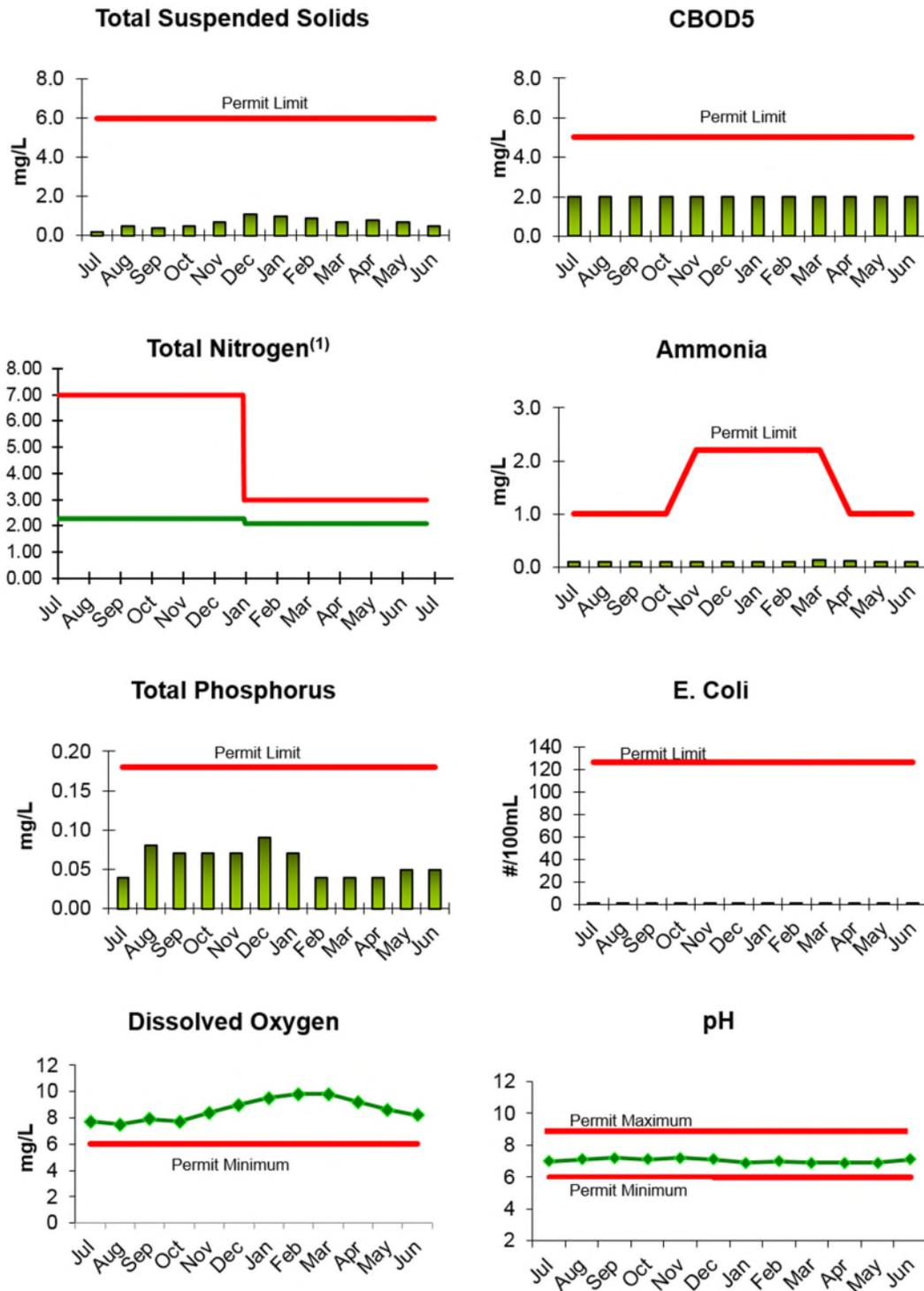
Reuse Water Characteristics	Treatment Standard	Annual Average
Flow	6.6 mgd	1.32 mgd
5-day Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	8 mg/L	2 mg/L
pH	6.0-9.0	7.0
Turbidity	5 NTU	0.44 NTU
Total Nitrogen (TN)	8 mg/L	2.09 mg/L
Total Phosphorus (TP)	1 mg/L	0.06 mg/L
Total Residual Chlorine ⁽¹⁾	1 mg/L	2.2 mg/L
Bacterial Standards ⁽²⁾		
<i>Escherichia Coliform</i>	24/100 mL	1/100 mL

⁽¹⁾ After minimum contact time of 30 minutes at average flow or 20 minutes at peak flow

⁽²⁾ Measured as monthly geometric mean



Figure 2-17: NMCCPCP FY 2015 Effluent Quality



(1) Total nitrogen limits are based on a calendar year mass load allocation. The graph provides annual average effluent limits for CY 2014 and CY 2015.



2.3.4 Maintenance Branch

The Maintenance Branch at the NMCCPCP includes the Instrumentation, Electrical, Mechanical, and Buildings and Grounds Sections. This Branch, through their preventive maintenance and corrective equipment repair/replacement and asset management efforts, provides critical support in maintaining plant facilities, process equipment, and related instruments/control devices to achieve a high level of functionality and reliability throughout the plant.

Highlights for projects completed in FY 2015 or planned for FY 2016 include the following:

- **Primary Clarifiers:** The replacement plan for the primary clarifiers includes complete refurbishment of the sprockets, shafts, chains and flights and replacement of plastic materials with metal materials. Refurbishment of Primary Clarifier No. 7 with metal chains and laminated flights was completed in FY 2015. Primary Clarifiers No. 5 and 6 will be completed in FY 2017. In addition, six of the eight primary clarifiers bottoms are to be resurfaced with an epoxy finish.
- **Gravity Filter Facility:** Replacement DD1 and DD10 backwash pumps and 350hp motors were completed in FY 2015.
- **Monomedia Filter Facility (FF):** The Monomedia Filter Project calls for the removal and replacement of the filter media, repair of the under drain system in seven of the eight filter tanks and the complete replacement of the existing under drain system in Filter Tank 1. The removal and replacement of the filter media in the seven filter tanks was successfully completed in FY 2015 with excellent performance results. Filter Tank 1 will serve as a pilot for the new filter facilities and the underdrain system will be replaced with a Leopold IMS 200 Underdrain System in FY 2016.
- **Upgrading of the Continuous Emission Monitoring System (CEMS):** Upgrades to the CEM System for the K1 and K2 Sludge Incineration Facility were completed in FY 2015. The scope included replacement, testing, and calibrating of twelve analyzers that automatically generate THC and Oxygen daily and monthly reports and the performance of quarterly inspection reports.
- **Induced Draft Fan Replacement:** This project included solicitation and coordination of in-house personnel for the rehabilitation and installation of the Induced Draft (ID) Fan for Incinerator No. 3. The fabrication and installation for Incinerator No. 4 ID Fan will be procured and installed by the K1/K2 Scrubber Contractor, IFCO. In FY 2015 in-house



maintenance staff replaced both Incinerator's ID Fan Variable Frequency Drives and bypass dampers.

- **Administration and Laboratory Building Chiller Replacement:** The existing chillers are approaching their useful life and action has commenced for the replacement of both chillers in FY 2016 – FY 2017. The scope calls for the procurement of two new chillers to be installed on the roof top of the Laboratory Building's Mechanical Room. The County's Capital Facilities Group is currently conducting the search for a HVAC consultant to assist.
- **Solids Handling Equipment Control System Upgrades:** This project includes conversion of the existing PLCs to Allen Bradley ControlLogix System. In FY 2016 new control systems will be installed for the dewatering centrifuges and Incinerators K1 and K2.
- **Backup Power to New Generator System:** In FY 2016 in-house electrical staff will install over 500 feet of conductors alleviate potential problems associated with a single feed (DVP 313) to the generator pad.

2.3.5 Wastewater Treatment Division Facilities Inspection

Hazen and Sawyer conducted in-person interviews with the Chiefs for the Maintenance, Engineering Support, and Plant Operations branches in February and March 2015. The purpose of these meetings was to discuss the operation and maintenance of NMCCP and other administrative responsibilities, as well as the future goals of the Division.

Facilities at the plant include mechanical bar screens, sewage pumping, primary clarification, off-line flow equalization, activated sludge enhanced nutrient removal (ENR) treatment and settling, along with in-line flow equalization, secondary effluent pumping, post-anoxic denitrification through moving bed biofilm reactor (MBBR) with methanol addition, chemical clarification, gravity filtration, filter effluent pumping, chlorination, and dechlorination. Primary and Waste Activated Sludge is thickened, dewatered, and incinerated onsite with dry ash hauled to and disposed of in a sanitary landfill. Screenings and grit are hauled to and disposed of at the Covanta Waste-to-Energy Facility. Hazen and Sawyer inspected the plant on March 10, 2016. The tour included K1/K2 building, dissolved air floatation (DAF) thickeners, MCC 19, the new methanol storage facility, the FF Filter Building, and the GFE pump station. Relevant pictures of the tour are provided in Figure 2-18 through Figure 2-23.



Figure 2-18: DAF Thickener Rehabilitation



Figure 2-19: New ID Fan on Incinerator 2



Figure 2-20: MCC 19 to be Rehabilitated



Figure 2-21: Methanol Storage Facility



Figure 2-22: FF Filters to be Rehabilitated



Figure 2-23: New Backwash Pump Motor





2.4 Wastewater Planning and Monitoring Division

2.4.1 Overview of Division

The Wastewater Planning and Monitoring Division (WPMD) performs a number of technical and administrative functions for the Wastewater Management Program. These functions include (1) reviewing system development and additional treatment capacity needs, (2) administration and management of the system's financial operations, (3) administration of contract capacity for the County's wastewater flows to inter-jurisdictional plants and other jurisdictions' flows to the County's plant, (4) evaluating developer plans for compliance, (5) providing environmental laboratory support for the Program, and (6) managing the federal and state pretreatment requirements under the Clean Water Act.

The Division includes three branches, the Engineering Analysis and Planning Branch, the Environmental Monitoring Branch, and the Fiscal Control and Financial Management Branch are discussed in further detail in Sections 2.4.2, 2.4.3, and 2.5, respectively. There were 54 budgeted positions in the WPMD for FY 2015, this will be reduced to 53 in FY 2016. All staff, except for laboratory, warehouse personnel and pretreatment personnel, are located in the Fairfax County Government Center.

The Division, in coordination with WTD and WCD, continues its Asset Management work for the entire Wastewater Management Program. The Asset Management Team (AMT) develops and implements a program-wide business process that supports the capital planning needs of the Wastewater Management Program. Based on the outlined methodologies of component assessment and criticality rating, the AMT identifies major infrastructure components within the Wastewater Management Program that require upgrades and develops an accurate repair and replacement budget, which provides an incentive to developers to install larger facilities serving a larger sewershed so the project limits will include facilities for future developments.

2.4.2 Engineering Analysis and Planning Branch

The Engineering Analysis and Planning Branch is responsible for collection system planning, updating the Sewer Facility Plan, and evaluating rezoning and Comprehensive Plan changes to determine their impact relative to the capacity of the sewer system including the treatment plants. The Branch uses InfoSewer®, a system-wide hydraulic model to evaluate the capacity of the system and plan for future use. This Engineering Analysis and Planning Branch reviews developer's construction plans and the County's Extension and Improvement sanitary sewer



plans to ensure compliance with the Fairfax County Public Facilities Manual, Board of Supervisors adopted sewer policy, and state regulations. As part of the plan review process, the Branch initiates and maintains the sanitary sewer reimbursement program, which provides an incentive to developers to install larger facilities to serve a larger sewershed so facilities will be in place for future developments.

The Engineering Analysis and Planning Branch is the primary point of contact for public inquiries concerning sewer availability or issues regarding connections to sewer or installation of new facilities and, the Branch often coordinates with other groups inside and outside of the Wastewater Management Program. The Branch develops and implements the Wastewater Management Program's Geographical Information System (GIS) needs and initiatives. This includes training, database management, development, and recommendation of GIS software and products. The Branch maintains approximately forty-three (43) GIS enterprise layers, their related attribute tables, and approximately twenty-one (21) applications.

The highlights of GIS initiatives for FY 2015 include:

- Migrated the SewerSys application from Visual Basic 6.0 (VB6) technology to a web based application.
- Created a Food Establishment layer to assist the Wastewater Collection Division in Fats, Oil, and Grease (FOG) remediation and Industrial Waste Pretreatment Program. The Food Establishment layer will be used by Fairfax County Grease trap inspectors to assess and monitor individual establishments.
- Implemented ArcGIS online with a mobile device application that serves out sanitary sewer network and as-built data.
- Migrated all GIS extensions and tools from VB6 to .NET technology.

In FY 2016, the Branch plans to:

- Migrate to ArcGIS 10.4.
- Continue the position accuracy project. County staff will use mobile devices and GIS software to update new construction, as-built information, and coordinates of assets for incorporation in the GIS database.
- Complete the Countywide Sewer Capacity study. The study will use Metropolitan Council of Governments traffic analysis zones and per capita wastewater generation rates to



evaluate the capacity of primary sewer lines in the collection system through 2040. The study will account for varying degrees of residential and commercial development through sewershed specific wastewater generation rates. The results will be used to guide the County to areas which require in-depth analysis and/or monitoring before actual sewer replacement projects are undertaken.

- Develop contact information and Who is Who for the Branch to facilitate the routing of telephone calls/inquiries from citizens by the administrative assistant to Engineering Analysis and Planning Branch staff.

2.4.3 Environmental Monitoring Branch

The Environmental Monitoring Branch located at the Noman M. Cole, Jr. Pollution Control Plant (NMCPCP), operates a Virginia Environmental Laboratory Accreditation Program (VELAP) certified environmental laboratory. The Branch also administers the Pretreatment Program requirements/regulations under the Federal Clean Water Act and the Virginia Water Control Act to regulate the use of the Fairfax County wastewater conveyance and treatment systems. The Branch has three components: Laboratory Section, Instrumentation/Laboratory Information Management System (LIMS) Section, and the Industrial Waste Section (IWS). The Branch also manages the Wastewater Management Program's Outreach and Education activities.

The Environmental Monitoring Laboratory Section conducts routine and specialized analyses necessary to meet and demonstrate permit compliance, and to support process optimization needs for the operation of the NMCPCP. The Laboratory also performs analyses for other County agencies including the Stormwater Management Program, the Division of Vehicle Services, and the Solid Waste Management Program. In addition, the laboratory also conducts ecosystem monitoring such as the Gunston Cove Monitoring Program. This work is in cooperation with a George Mason University (GMU) study, funded by the Wastewater Management Program, measures water quality, biological composition and abundance, and species diversity in and around the receiving waters for the treated wastewater effluent from the NMCPCP. Additional monitoring is performed in collaboration with the Fairfax County Stormwater Division and United States Geological Services to evaluate best management practices implemented to minimize nutrient loading to County streams and ultimately the Chesapeake Bay. In addition, the Laboratory participates in the Chesapeake Bay Coordinated Split Sample Program (CSSP) with other laboratories in the region. The CSSP was started to validate water quality data generated by the Chesapeake Bay monitoring programs. The CSSP is an inter-laboratory testing program that



involves the preparation of identical surface water samples for subsequent analysis at participating state, federal and academic water quality laboratories.

The IWS administers the Pretreatment Program for Fairfax County which ensures compliance with regulations under the Federal Clean Water Act and the Virginia State Water Control Act for the use of the Fairfax County's wastewater conveyance and treatment systems. This Program prevents introduction of pollutants from users which may interfere with or pass through the treatment process, contaminate sewage sludge, damage infrastructure, and/or create a hazardous environment for maintenance workers. This Program also facilitates compliance with wastewater discharge permits. IWS also ensures that all reclaimed water from the NMCCPCP meets Virginia's Water Reclamation and Reuse Regulations, and that all users are in full compliance with reuse requirements as well as with the requirements for public notification and education, and facility operation and maintenance.

The Outreach and Education Program provides support to all three divisions of Wastewater Management. Activities include in-school educational programs and participation in County-sponsored community events. These targeted outreach and education programs help to advance community awareness and inform and engage stakeholders about wastewater management and the importance of sustainable water quality for the County and the region.

The Environmental Monitoring Branch notable accomplishments for CY 2015 include:

- Conducted more than 43,000 water quality analyses necessary for implementing the Environmental Monitoring Laboratory mission and in support of other County programs.
- Maintained its certification for all approved analytic testing methods through a successful audit by the Virginia Environmental Laboratory Accreditation Program (VELAP). The Laboratory is certified in methods covering 250 analytes.
- The Laboratory provided cross training in all aspects of advanced analytical methods and quality assurance process. Staff development and quality assurance remains a program priority in order to maintain VELAP certification and enhance laboratory capacity, capability and reliability.
- The Laboratory continued support of the Wastewater Treatment Division (WTD) in monitoring the operation and performance of the NMCCPCP, including conducting analyses required under the Virginia Pollution Discharge Elimination System (VPDES) permits for effluent and stormwater discharge. This includes analytical support of plant treatment process modifications, improvements, and pilot studies.



- Through enhanced efficiencies, the Laboratory continued analytical support for both the Water Reuse Program and increased analytical support for the County's lake monitoring initiative by the Stormwater Management Program without adding additional staff. The IWS also ensured that all reclaimed water from the NMCCP met Virginia's Water Reclamation and Reuse Regulations, and that all users were in full compliance with reuse requirements as well as with the requirements for public notification and education, and facility operation and maintenance.
- Assisted the WCD in assessing the water quality of surface water and well water in Reston and Great Falls, respectively, following FY 2015 Sanitary Sewer Overflow (SSO) events. This monitoring determined that surface water quality was minimally affected following the Reston SSO and private wells near the Great Falls SSO were not contaminated. WCD uses this information to determine if and when a public advisory notices should be posted to limit recreational activities during impacted periods in order to minimize public health impacts.
- Continued its collaboration with GMU in monitoring the water quality of Gunston Cove to assess the impact of the NMCCP discharge. Monitoring results are shared with GMU researchers, who gather and evaluate data on the Gunston Cove biota. Together, the Branch and GMU collect and analyze hundreds of field measurements and samples yearly. This data forms the basis of the ecological assessment of Gunston Cove. The results demonstrate considerable ecological and water quality recovery in the Cove demonstrating the results of the County's investment in advanced wastewater treatment technology over the past decades.
- Achieved full compliance with all applicable pretreatment requirements and re-evaluated the local pretreatment limit for cyanide for the NMCCP in CY 2015. This assessment was a continuation of the comprehensive local limits re-evaluation conducted in CY 2013 - 2014, which is required by NMCCP's VPDES permit, and ensures that Fairfax County's wastewater infrastructure minimizes hazards to worker health and safety and is protected against interferences such as damage to the sanitary sewer system. It also protects against disruption of the treatment plant and the pass-through of pollutants from the plant discharge to Pohick Creek. The re-evaluation of the cyanide local limit was extended into 2015 to evaluate the potential impacts of recent operational changes at NMCCP on the fate of cyanide concentrations in the treatment system. The IWS led this effort and collected samples quarterly from the two interceptors serving the NMCCP and



throughout the NMCPCP treatment process. These samples were analyzed for total cyanide by the Environmental Monitoring Laboratory. Due to constraints in quantifying cyanide concentrations below the method reporting limit, the results were insufficient to recalculate the local limit. Therefore, the monitoring study will be extended through 2016. The current cyanide local limit, which is sufficiently protective of Fairfax County's publicly owned treatment works, will be retained during the re-evaluation period.

- Monitored the delivery of hauled septage waste to the two designated receiving facilities in the County, and enforced the County code that applies to hauled waste. Both the Colvin Run Septage Receiving Facility and the NMCPCP Septage Receiving Facility receive waste from haulers who service residential and commercial septic tanks, portable toilets located at special events and construction sites, and restaurant grease traps/interceptors. The septage facilities are connected to the sanitary sewer system, which conveys the waste from the northern facility to DC Water's Blue Plains AWTP and from the southern facility to the NMCPCP. In 2015, IWS enhanced its regulatory oversight of septage disposal at both facilities. In addition to more frequent onsite inspections, septage haulers using the Colvin Run facility have been required to submit manifests for all deliveries since July 2015. IWS is using inspection results and manifest information to assess the source of waste generated and enforce compliance with County municipal codes and inter-municipal agreements.
- Continued to partner with the Stormwater Planning Division (SWPD) and Building Plan Review and Inspections Division to identify and control illicit wastewater discharges to the County's municipal storm collection/conveyance system. Sources addressed included marble, stone and granite fabricators, swimming pools and cooling water towers. IWS worked with these businesses to ensure proper connection to the sanitary sewer in order to maintain their operations.
- Collaborated with WCD, Health Department, SWPD, to enhance the Wastewater Management Program's fats, oils and grease (FOG) control program. Procedures for food service establishment inspection, compliance assessment, and corrective action were updated by the IWS team, which now includes a dedicated FOG inspector. Implementation of the updated procedures resulted in reduced FOG discharge from restaurants. A public service announcement, produced in collaboration with the Communications Productions Division, provides essential guidance to food service establishment employees on proper management of FOG.



- Collaborated with WCD to develop and implement a public education program to minimize the discharge of fats, oils and grease (FOG) to the sanitary sewer system. A residential public service announcement and door hanger were distributed advising residents about potential sewer backups if FOG and “flushable wipes” are not disposed of in the trash instead of down the drain. The outreach team posted information on best kitchen practices in stores of a major grocery chain serving the County and spoke to shoppers at a local grocery store about best kitchen practices.
- Provided programs through the Sewer Science education efforts at 13 County high schools involving 17 teachers, 41 classes and approximately 1,190 students. The outreach program organized or participated in a multitude of County-organized community events and town hall meetings to raise awareness of wastewater management.
- Sponsored a Water Quality Field Day Event for 134 elementary students at the NMCCPCP to support the public school system’s 6th grade water curriculum on “What do you know about H₂O?”. The event was collaborative effort with Fairfax Water, Virginia Department of Environmental Quality, GMU, Northern Virginia Soil Conservation, Urban Forest and Fairfax County’s Storm Water Management Program.
- Deployed its Outreach Team (comprised of staff from WPMD, WTD, and WCD) to raise County resident awareness of wastewater management in the County. The Outreach Team participated in several community-based forums including Supervisor Hyland Mt. Vernon Town Hall, Mason Neck State Park’s Annual Eagle Festival, Lorton Workhouse Earth Day, Touch a Truck at Chantilly Library and Fort Belvoir Elementary School Family Day.
- Implemented additional outreach efforts including regional campaigns for the “Can the Grease” and “Don’t Flush” efforts by airing Public Service Announcements on media outlets such as Facebook and Twitter as well as County and regional web sites. These efforts also included participating in local and regional police station Take Back Program.

While continuing to carry out its required water quality monitoring, enforcement of applicable pretreatment regulations, and outreach and education mission, in CY 2016 the Environmental Monitoring Branch will emphasize several activities in order to enhance program effectiveness including:



- Continue to collaborate with the WCD and the Health Department to assess the magnitude and establish an oversight process to minimize the impact of FOG discharged by food service establishments on the sanitary sewer system.
- Sponsor a proposal to establish a fee program for septage haulers and industrial user permits. Continue to strengthen the oversight and compliance assurance for the County's septage management system in collaboration with Wastewater Collection Division and the Health Department who co-regulates septage haulers.
- Assess and monitor evolving pretreatment requirements (e.g., dental care facilities oversight to control mercury amalgam discharges, and minimizing polychlorinated biphenyls discharges) and respond as needed.
- Successfully complete VELAP audit and maintain certification for all approved analytical methods.
- Stay abreast of analytical method changes and updates and quality assurance requirements and incorporate advances into operating procedures.
- Update and enhance the LIMS to enhance analytical results reporting, integrate new replacement instruments, improve sample identification and management, and adapt field-IT capability to facilitate sampling and monitoring tasks.
- Adopt additional analytical methods, which meet certification requirements, to enhance Laboratory's capability to meet additional water quality information needs by the County's Wastewater, Stormwater and Solid Waste Programs.
- Provide support to the County's Stormwater Management Program and collaborate in their efforts to conduct inspections and reduce illicit discharges.
- Expand the Sewer Science initiative curriculum in collaboration with the County's school system and other agencies (e.g., stormwater management) to elementary and middle schools to extend the learning for younger students.
- Leverage collaboration with the County school system to establish a department-wide partnership with school-based career specialist/counselors to identify and recruit candidates who would be interested in pursuing a career in the trades. The goal is to establish a formal program encompassing all high schools and giving graduates who may not attend college the opportunity for a meaningful career with the County in hard-to-fill positions that are critical to the Wastewater Management Program.



2.5 Fiscal Control and Financial Planning Branch

The Fiscal Control and Financial Planning Branch is responsible for overall financial management and financial planning of the Wastewater Management Program and continually analyzes the financial position of the Program in order to maintain competitive rates, high bond ratings, and achieve financial targets. In conjunction with the County Department of Finance, this Branch produces the Wastewater Management Program's Comprehensive Annual Financial Report (CAFR) for the Integrated Sewer System that satisfies both generally accepted accounting principles and applicable financial reporting requirements. The Wastewater Management Program completed its fiscal year on June 30 2015. The FY 2015 CAFR was completed during FY 2016 and been successfully submitted to the Government Finances Officers Association of the United States and Canada (GFOA) for review.

The Wastewater Management Program has been awarded a Certificate of Achievement for Excellence in Financial Reporting by the GFOA for the FY 2015 CAFR. The Certificate of Achievement is the highest recognition available in the area of government accounting and financial reporting, and its attainment represents a significant accomplishment by a government entity and its management. The Wastewater Management Program's CAFRs are judged by an impartial panel to meet the high standards of the GFOA's program, to include demonstrating a constructive "spirit of full disclosure" to clearly communicate its financial story and motivate potential users and user groups to read the CAFR.

The Wastewater Management Program continues to meet its strategic planning goals as they relate to the financial reporting process. In FY 2015 the Wastewater Management Program maintained its AAA Bond Rating from Fitch and Standard & Poor (S&P) and Moody's recently upgraded the Sewer Revenue Bonds to Aaa. These high credit ratings have enabled the County to sell bonds on behalf of the Program at competitive interest rates, and the Branch is responsible for issuing and managing debt to fund major expansion and upgrade projects for the NMCCPCP and its portion of "Treatment by Contract" facilities.

The Fiscal Control and Financial Planning Branch is responsible for managing seven separate enterprise funds that are the basis for funding the Wastewater Management Program, that includes budget preparation of the Sewer Operating and Maintenance Fund, Sewer Bond Debt Service Fund, Sewer Bond Subordinate Debt Fund, Sewer Construction Fund, Sewer Bond Construction, and Sewer Revenue Fund. Details of the sewer funds are described in Section 3.1.



To ensure that the Wastewater Management Program provides high performance operation and service quality, the Branch closely monitors the following areas:

- Sewer services charges (\$/1000 gallons)
- Treatment costs (\$/mgd)
- Number of sewer system overflows (5-year rolling average)
- Odor complaints per year

The Fiscal Control and Financial Planning Branch is also responsible for the annual submission of the Five Year Capital Improvement Program. To ensure system revenues are adequate to support all the financial activities within the Wastewater Management Program, a Five Year Financial Forecast is developed annually with the assistance of a financial services consultant. A five-year rate schedule is developed annually utilizing a financial model designed to track several financial measures to ensure the county's rate remain competitive, support the bond rating and provide funds for all the financial activities of the Wastewater Management Program. Financial indicators used in the model are presented in Table 2-7. In recent years the Branch has recommended a phase-in approach to increase rate both the service charge (\$/1000 gal) and the quarterly base charge. Details of the proposed 5-year rate increases are presented in Appendix B.

Table 2-7: Calculated Financial Indicators

Financial Indicator	Target	Achieved	FY 2016	FY 2017
Net Revenue Margin	45.0% to 52.0%	Yes	51.9%	51.0%
Days Working Capital	150 to 200 days	Yes	157	157
Debt Coverage Senior	Min 3.00x	Yes	3.37x	3.51x
Debt Coverage All-in	1.80x to 2.1x	Yes	2.09x	1.98x
Affordability (% of median income spent on sewer bill)	Less than 1.2%	Yes	0.5%	0.5%
Debt to Net Plant in Service	40.0% to 50.0%	Yes	48.5%	49.5%
Outstanding Debt per Connection	Max \$3,000	Yes	\$1,556	\$1,610
Anticipated Sewer Bond Sales Through FY 2019				\$100.0M

This Branch is also responsible for the warehouse inventory and supply management for the overall Wastewater Management Program. The Property Managers at WCD and WTD are responsible for warehouse inventory and supply management for their respective divisions. It operates the third highest valued inventory warehouse in the County. Inventory spot checks continue to demonstrate accuracy average for physical inventory cycle counts at 100%, with a gross value adjustment of 0.0%. The results of the FY 2015 Physical Inventory of Accountable



Fixed Assets conducted in May 2014 showed an inventory accuracy rate of 100% on WCD's Consumable Inventory with a gross value adjustment rate of 0% (see Appendix A). These values exceed the County's standards of 97% and 0.75% for Inventory Accuracy and Gross Value Adjustments, respectively.

Hazen and Sawyer met with the Financial Manager for the Wastewater Management Program on February 17 and May 3, 2016 and communicated via email on FY 2015 results, current financial status for FY 2016 and future financial projections. The Program appears to be in solid financial shape at this point in time with performance projections continuing this trend.



2.6 Information Technology Branch

Wastewater Management Program Information Technology (IT) Branch is an integral part of Wastewater Treatment Division (WTD), Wastewater Collection Division (WCD) and Wastewater Planning and Monitoring Division (WPMD). The IT Branch provides critical system support to the entire Wastewater Management Program. This includes the NMCCCP network and telecommunications system, its business application system, which is comprised of the Enterprise Asset Management System (InforEAM), as-built yard piping and GIS system, SCADA Systems for the NMCCCP and 63 Wastewater Pump Stations, Automated Weather Monitoring System (AWS), Laboratory Information Management System (LIMS) database systems, Wastewater Collection CCTV WinCam EVI system, Miss Utility TelDig System and online O&M web application. This Branch supports operations, maintenance, and engineering staff needs related to computers and information systems, including training and software and hardware deployment.

The IT Branch has continued to improve and remain a high performance branch by providing quality, reliable, available, and secure information technology systems and resources in support of the mission and strategic objectives of the Wastewater Management Program, and in compliance with the DPWES and County information technology policies. IT staff within each Division work together under the same leadership to manage and support IT infrastructure and automation systems for the entire Wastewater Management Program including following major systems,

- Supervisory Control and Data Acquisition system (SCADA)
- Network infrastructure for NMCCCP, 63 sewage pumping stations and 3 water reuse pump stations
- Enterprise Asset Management System (InforEAM ASE V11.0 Build 201410)
- Enterprise Asset Management System Mobile System
- Laboratory Information Management System (SampleMaster V9)
- Automated Ticket Management System (TelDig Utility) for Miss Utility
- Online Operation and Maintenance Document Library
- Automated Real Time Weather Monitoring System
- Wastewater Collection CCTV Inspection WinCam V8 system
- ActSoft GPS tracking system for 90 Wastewater Collection field vehicles
- EnviroSim BioWin 5.0 to simulate operations in wastewater treatment plants
- FactoryTalk® EnergyMetrix web-enabled management software package



The Wastewater Management IT infrastructure is composed of three local area networks, one for each division, located at the Robert P. McMath Facility (WCD), the NMCCPCP (WTD) and the Fairfax County Government Center (WPMD), respectively. These networks are part of the Fairfax County government Enterprise system. The County currently has a total of 63 sewage pumping stations and 3 waster reuse pump stations connected to the local area network (LAN) at the Robert P. McMath Facility and NMCCPCP through Cox Metro Ethernet service.

The SCADA systems at NMCCPCP and the Robert P. McMath Facility are protected with internal security firewall, and all systems and hardware have a private IP address providing network security protection and mitigating the security risks inherent in the use of the SCADA system. The County has all SCADA maintenance agreements consolidated into one contract. This streamlines software provides SCADA redundancy in virtualized environment for wastewater collection and treatment processes, reducing SCADA downtime and addressing some SCADA disaster recovery needs.

The IT Branch highlights for FY 2015 are described below:

- Upgraded SCADA core switches and the industrial switches at 17 plant control rooms and created a new subnet (VLAN16) for NMCCPCP plant SCADA system to improve the network communication between SCADA and PLCs.
- Worked with CAP and CH2M on building a backup server room for NMCCPCP data center.
- Worked with DIT network communication team to implement the COOP service for critical network infrastructures for NMCCPCP and McMath facility at Fred's Oak.
- Upgraded SCADA servers to Windows 2012.
- Installed/configured Windows 2012 R2 Remote Desktop Service (RDS) license server and configured a thirty (30) licensing pool that can be distributed for one (1) RD session host in the SCADA development and two (2) in SCADA production environment.
- Upgraded SCADA iFix to V5.8 and iHistorian to V6.0, migrated SCADA system to VMware 6.0 platform for enhance SCADA high availability.
- Replaced 90% Wastewater Collection Pump Station SCADA system Ethernet lines with Cox Metro E-service.
- Designed and developed InforEAM Requisition module to replace WWM online requisition application.



- Worked with the Environmental Laboratory to successfully upgrade SampleMaster to V9, migrated the database backend to SQL server which enables the Lab for future testing equipment automation plan and system upgrade.
- Provided prompt IT support for Environmental Lab to install new equipment for PC-BOD, GCMS, Lachet and ICP. Migrated lab equipment computers to Wastewater Management Program domain to ensure the sample testing without interruption of Windows security and patching process, also provide the capability of backing up the lab sample testing data to network resource per permit requirement.
- Installed and configured TeIDig Backup server on Windows 2012 server; upgraded all the Miss Utility clients' workstations to the latest version of TedDig utility version 29.6 4.
- Installed, configured and deployed a new WSUS server version 6.3 which is running with Windows 2012 R2 standard edition. Migrated Microsoft security patches and database to new WSUS server.
- Maintained Wastewater Management Program IT infrastructure up to date with Microsoft security and patch updates.
- Upgraded the ArcServe backup system and implemented the new Symantec backup to enhance the backup/restore performance.
- Continued to provide IT support to SCADA project consultant/contractors at NMCPCP and WCD pump stations.
- Completed 2015 PC replacement program.
- Provided effective computer and user support for entire Wastewater Management Program business area.

In FY 2016, the IT Branch plans to:

- Complete the SCADA core switches replacement with redundant Catalyst 4506E switches, and 2960 CISCO switches in 17 plant SCADA control rooms with CISCO IE3000 industry standard switches.
- Complete the separation of Wastewater SCADA business and PLC network to better secure an Integrated SCADA System.
- Continue working with CAP and CH2M on building the backup server room for NMCPCP data center.
- Continue implementation effort on the COOP service for critical network infrastructures for NMCPCP and McMath facility at Fred's Oak.



- Working with WCD PAB to implement the InforMaster system for Wastewater Asset planning and CIP project development.
- Wastewater Management Business legacy application system re-design and replacement, migrate Access applications to .Net web application.
- Complete installation of the Cox Metro E-services ethernet lines.
- Upgrade InforEAM Oracle database to 12c, and InforEAM servers upgrade to Windows 2012.
- Work with NMCCPCP asset management team to develop InforEAM Asset Hierarchy project for the Plant.
- Complete the design of InforEAM Requisition module to replace Wastewater Management Program online requisition application, provide end user trainings.
- Working with NMCCPCP asset management team to enhance the plant asset data integrity in the InforEAM database.
- Develop InforEAM OpenCAD software package for NMCCPCP underground utility project.
- Continue 2016 PC replacement program.
- Continue providing support to SCADA consultant/contractors at the plant and WCD pump stations.
- Maintain Wastewater Management IT infrastructure up to date with Microsoft security and patch updates.
- Continue providing effective computer and user support for entire Wastewater Management Program business area.



2.7 Human Resources/Organizational Development/Safety Section

To enhance sharing of information and improve communications between the various Divisions, services related to Human Resources (HR), Organizational Development (OD) and Safety are combined under a centralized consolidated leadership referred to as the “HR/OD/Safety Section”. This section oversees human resources requirements for the entire Wastewater Management Program. As part of organizational development, this section designs training plans for various Divisions and oversees the safety program for the entire Program.

Two Safety Analysts support the Wastewater Management Program. One analyst is located at the WCD and one is located at the WTD, supervised individually by the Human Resources Manager and the Director of WTD, respectively. The Safety Analysts share the responsibility of supporting WPMD and assisting with its safety needs. Each year the Wastewater Management Program sponsors Safety Awards at the annual Awards Ceremony. One-, three-, five-, ten-, and fifteen-year recognition awards are presented every year under two categories: 1) Injury and Illness and 2) Driving. In FY 2015 the WCD presented 34 Safety Awards, the WTD presented 35 Safety Awards and the WPMD presented 2 Safety Awards.

Safety continues to be a key value of the County’s Wastewater Management Program. The safety program continues to make progress in implementing and strengthening programmatic elements across all three divisions. Highlights from each branch are summarized below:

- WCD continues to hold periodic safety meetings with their staff. These sessions serve to both enhance and reinforce their knowledge of workplace hazards and the procedures and equipment necessary to insure their well-being. Typical meeting and tailgate topics include permit-required confined space entry, lockout/tagout, powered industrial trucks (forklifts, etc.), VDOT flagging and work zone operations, and electrical safety including arc flash.
- EMB retained a safety consultant to assist in preparing a health and safety manual for field activities. This safety manual includes job hazard assessments (JHAs) for routinely monitored locations, including permitted industrial users and NMCCPCP. The JHAs identify unique site hazards and the personal protective equipment (PPE) and administrative controls that will be applied to mitigate the hazards. In addition, the EMB participated in annual Hazard Communication (Right-to-Know) training as well personal protective equipment training to reinforce safe laboratory and chemical handling practices.



2.8 Wastewater Flows and Treatment Capacity

A significant portion of the wastewater generated in Fairfax County is treated by surrounding jurisdictions, and the County, in turn, treats flows from several other jurisdictions at the NMCCPCP. These arrangements are administered through inter-jurisdictional agreements and are designed to maximize the benefit of the wastewater treatment dollar for the County and the region as a whole. The County has agreements to convey its wastewater to the following facilities for treatment:

- DC Water's Blue Plains Advanced Wastewater Treatment Plant (Washington, DC)
- Alexandria Renew Enterprises' Water Resource Recovery Facility (Alexandria, VA)
- Arlington County Water Pollution Control Plant (Arlington, VA)
- Upper Occoquan Service Authority (UOSA) Water Reclamation Facility, (Centreville, VA)
- Prince William County Service Authority (PWCSA) Advanced Water Reclamation Facility (Prince William County, VA)
- Harbor View Wastewater Treatment Plant (Fairfax County, VA)
- Broad Run Water Reclamation Facility (Loudoun County, VA)

The County also has agreements to treat flows at the NMCCPCP from the following:

- Fairfax City
- Fort Belvoir
- Town of Herndon
- Arlington County
- City of Falls Church
- Town of Vienna
- Fairfax County Water Authority
- Covanta/ERR Facility
- Loudoun Water



2.8.1 Treatment Capacity Status and Sufficiency

The following paragraphs describe the capacity status and sufficiency of each of the treatment plants that receive County flows.

Noman M. Cole, Jr. Pollution Control Plant

The Noman M. Cole, Jr., Pollution Control Plant (NMPCP) serves the Accotink, Pohick, Long Branch, Little Hunting and Dogue Creek drainage basins. In addition to flows originating within the County, the plant also treats sewage from the City of Fairfax, Fort Belvoir and part of the Town of Vienna. The NMPCP was put into service in 1970 with an initial design capacity of 18 mgd, which was subsequently increased to a rating of 36 mgd of advanced treatment in 1978, 54 mgd in 1995 and again increased to a rating of 67 mgd in 2005.

In order to meet the anticipated needs for sanitary sewage service in sewersheds that contribute to the NMPCP, as well as meet new water quality standards for nitrogen control, expansion of the plant to 67 mgd was initiated in 1992. Construction began in 1997 and was completed in 2005. The NMPCP is now capable of handling anticipated flows from its contributory sheds through 2040. Construction has been completed to meet additional enhanced nutrient removal requirements.

Alexandria Renew Enterprises Water Resource Recovery Facility

The Cameron Run and Belle Haven sewersheds and the City of Falls Church, while included in the Fairfax County sewershed, are treated by the Alexandria Renew Enterprises (AlexRenew) Water Resource Recovery Facility. Sixty percent of the plant's capacity is contractually allocated to Fairfax County. The AlexRenew plant has been expanded and upgraded to provide 54 mgd of advanced secondary treatment capacity. Fairfax County is allotted 32.4 mgd of this capacity.

By reactivating the Braddock Road and Keene Mill Road pumping stations, the County has the capability to divert flow from the Accotink sewershed to AlexRenew. These diversions would increase operational flexibility in the entire eastern portion of the County by providing the option of off-loading a portion of the flows that would otherwise go to the NMPCP and Blue Plains Wastewater Treatment Plant to the AlexRenew plant. The County's existing capacity at the AlexRenew plant is now capable of handling anticipated flows from its contributory sewersheds through 2040.



Blue Plains Advanced Wastewater Treatment Plant (AWTP)

With a current capacity of 370 mgd, the District of Columbia Water and Sewer Authority (DC Water) Blue Plains Advanced Wastewater Treatment Plant (AWTP) is the largest plant in the area. In addition to the District of Columbia, it treats flows from Maryland, Virginia and several federal installations. Wastewater flows originating in the Sugarland Run, Horsepen Creek, Difficult Run, Scotts Run, Dead Run, Turkey Run, and Pimmit Run sewersheds are treated at Blue Plains. Fairfax County is presently allocated 31 mgd at the plant. Blue Plains will continue major renovations and improvements to the nitrogen removal processes, chemical feed and sludge disposal systems over the next several years. For flows beyond 31 mgd, up to 1.0 mgd can be offset via treatment at Loudoun Water. Flow beyond 32 mgd will be pumped over to NMCPCP via the Difficult Run Pump Station.

Arlington County Water Pollution Control Plant

The Arlington County Water Pollution Control Plant serves the portion of Fairfax County within the Four Mile Run sewershed. The plant has been expanded and upgraded to 40 mgd of advanced secondary capacity including nitrogen removal. The construction on the 40 mgd upgrade and nitrogen removal project were completed in 2013. The County's contractual capacity is 3.0 mgd. The County's existing capacity at the Arlington plant is sufficient for anticipated flows from its contributory sewersheds through 2040.

Upper Occoquan Service Authority

The southwestern part of Fairfax County is served by a regional plant owned and operated by the Upper Occoquan Service Authority (UOSA). When the UOSA plant expanded to 54 mgd, the County's flow allocation was increased to 27.6 mgd. Since that time, 4 mgd of this share has been sold to Prince William County and 1 mgd was sold to the City of Manassas, leaving the County with an allocation of 22.6 mgd. With these capacity sales, the County share in the UOSA plant is sufficient for anticipated flows from its contributory sewersheds through 2040.

Prince William County Service Authority

The southernmost section of Fairfax County is served by the H.L. Mooney Advanced Water Reclamation Facility (AWRF), owned and operated by the Prince William County Service Authority (PWCSA). Fairfax County is presently allocated 0.1 mgd at the H.L. Mooney AWRF. The County has no explicit and measureable interest in PWCSA but does have an ongoing financial responsibility for its share of operating expenses.



Harbor View Wastewater Treatment Plant

The Harbor View Wastewater Treatment Plant, owned by Colchester Utility Inc., treats flow from Harbor View, a small community in the southeastern part of the County. Fairfax County is presently allocated 0.08 mgd at the plant.

Loudoun Water

The northern portion of Fairfax County is currently served by Blue Plains and NMCCP. To provide additional capacity for the northern service area of Fairfax County, the County has purchased 1.0 mgd of capacity from Loudoun Water and may need up to an additional 2.0 mgd by 2025. Due to lower growth rates, reduced wastewater generation in the Blue Plains area may occur; accordingly, the County only purchased 1.0 mgd at this time. Flows going to Blue Plains are continually monitored to determine if any additional capacity will be required from Loudoun Water in the forecast period.

2.8.2 Flow and Capacity Summary

Table 2-8 summarizes the total wastewater treatment capacity available to Fairfax County, along with the historical and estimated future wastewater flow rates at the NMCCP and at each of the other facilities that treat wastewater from Fairfax County. The County provides service to several wholesale customers, referred to as “Sales of Service”. The treatment capacity available to the County is sufficient to meet expected demands during the forecast period.



Table 2-8: Capacity and Flow Rates of the Fairfax County Wastewater Management Program, FY 2015 - FY 2020

Treatment Plant	FY 2015 Actual (mgd)	FY 2016 Projected (mgd)	FY 2017 Projected (mgd)	FY 2018 Projected (mgd)	FY 2019 Projected (mgd)	FY 2020 Projected (mgd)
Wastewater Treatment Capacity Available to Fairfax County						
County-Owned Treatment Plant						
NMCCPCP	67	67	67	67	67	67
Inter-Jurisdictional Treatment Plants						
Alexandria	32.4	32.4	32.4	32.4	32.4	32.4
Blue Plains	31	31	31	31	31	31
Arlington	3	3	3	3	3	3
UOSA	22.6	22.6	22.6	22.6	22.6	22.6
Harbor View	0.08	0.08	0.08	0.08	0.08	0.08
PWCSA	0.1	0.1	0.1	0.1	0.1	0.1
Loudoun Water	1	1	1	1	1	1
<i>Total Inter-Jurisdictional Capacity</i>	<i>90.18</i>	<i>90.18</i>	<i>90.18</i>	<i>90.18</i>	<i>90.18</i>	<i>90.18</i>
Total Capacity Available	157.18	157.18	157.18	157.18	157.18	157.18
Actual and Projected Flow Rates of the Fairfax County Wastewater Management Program						
NMCCPCP						
County	33.46	34.43	37.40	40.36	43.33	46.30
Sales of Service	4.92	6.90	6.90	6.90	6.90	6.90
Pump-over from Blue Plains	0.00	0.00	0.00	0.51	1.95	3.40
Pump-over to ARE	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
<i>Total to NMCCPCP</i>	38.36	41.31	44.28	47.75	52.16	56.58
Alexandria						
County	15.48	16.03	16.67	17.31	17.96	18.60
Sales of Service	0.89	1.00	1.00	1.00	1.00	1.00
Pump-over from NMCCPCP	0.02	0.02	0.02	0.02	0.02	0.02
<i>Total To Alexandria</i>	16.39	17.03	17.69	18.33	18.98	19.62
Blue Plains						
County	24.28	24.92	26.36	27.81	29.25	30.70
Sales of Service	3.89	4.70	4.70	4.70	4.70	4.70
Pump-over to NMCCPCP	0.00	0.00	0.00	-0.51	-1.95	-3.40
Loudoun Water Offset	0.00	0.00	-0.06	-1.00	-1.00	-1.00
<i>Total to Blue Plains</i>	28.17	29.62	31.00	31.00	31.00	31.00
UOSA						
County	12.75	13.35	13.95	14.55	15.15	15.36
Sales of Service	0.12	0.13	0.14	0.15	0.16	0.17
<i>Total to UOSA</i>	12.87	13.48	14.09	14.70	15.31	15.92
Arlington	2.04	2.13	2.22	2.32	2.41	2.50
Loudoun Water	0.00	0.00	0.06	1.00	1.00	1.00
Other (PWCSA & Harbor View)	0.04	0.05	0.06	0.07	0.08	0.09
Total System Flow	97.87	103.62	109.40	115.17	120.94	126.71
Available Capacity for Growth	59.31	53.56	47.78	42.01	36.24	30.47



Section 3 FY 2016 Budget

3.1 Wastewater Management Program Funds

Hazen and Sawyer has examined the FY 2016 Adopted Budget for the Fairfax County Wastewater Management Program to assess the adequacy of funding to support its projected level of operation and maintenance. A general description of the system's outstanding debt service and funding structure is provided below, followed by a review of the FY 2016 Adopted budget (by cost center) and a review of historical trends in Wastewater Management Program costs.

As of June 30, 2015, the System's outstanding debt service was \$592.1 million; \$289.0 million in Senior Lien Sewer Revenue Bonds, \$37.4 million in Subordinate Obligation Virginia Resources Authority (VRA) financing, and \$265.7 million in Subordinate Obligation UOSA outstanding debt. The System continues to maintain its status as a top rated bond issuer: AAA from Fitch Investor Service and Standard and Poor's Corporation and Aaa from Moody's Investors Service, Inc.

The Wastewater Management Program is funded by seven separate sewer funds established by the County for financial and budgeting purposes. The sewer funds were reorganized with the adoption of the Sewer Bond Resolution in July 1985 and the defeasance of the 1954 Sewer Bond series in August 1986. Then, in FY 1998, the funds were restructured as part of an upgrade of the County's accounting computer system. Each of the funds is briefly described below.

Fund 69000 – Sewer Revenue

All operating revenues are credited to Fund 69000 *Sewer Revenue*. With the exception of interest earned from the balances of funds 69020, 69030, 69040 and 69310 (described in the following pages), interest on invested fund balances is credited to Fund 69000. Revenue receipts include lateral spur fees, sales of service fees, availability charges, connection charges, sewer service charges, miscellaneous revenue, sale of surplus property, and interest on investments. Receipts of Fund 69000 are then disbursed to Funds 69010, 69020, 69030, 69040, 69300, and 69310 to finance operations, debt service and construction. Any balance that remains after those transfers remains in Fund 69000 and is used for future year requirements and required reserves. Total revenues of \$222,332,902 are projected for FY 2016. An estimated total reserve balance of \$106,551,405 is projected for FY 2016.



Fund 69010 – Sewer Operation and Maintenance

Fund 69010 *Sewer Operation and Maintenance*, provides funding for operational expenses of the Wastewater Management Program. This includes personnel services, operational expenses, and capital equipment for all divisions (WCD, WTD and WPMD) and treatment by contract expenditures. A total expenditure of \$96,283,072 is proposed for FY 2016 for Fund 69010.

Fund 69020– Sewer Bond Parity Debt Service

Fund 69020 *Sewer Bond Parity Debt Service*, records debt service obligations incurred from bonds issued in accordance with the 1986 Sewer Bond Resolution. Bond proceeds are used to fund capital improvement requirements of the Wastewater Management Program including upgrades to treatment facilities. At the regularly scheduled quarterly review, necessary adjustments are made to this fund to support new initiatives of the Program. In FY 2016, \$20,906,350 is required to fund \$7,655,000 in principal payments and \$13,241,350 in interest payments associated with outstanding 2009, 2012, and 2014 Sewer Revenue Bonds, as well as \$10,000 in fiscal agent fees.

Fund 69030 – Sewer Bond Debt Reserves

Fund 69030 *Sewer Bond Debt Reserve*, fulfills the County's requirement to maintain a Reserve Fund for existing and planned sewer bonds. As outlined in the 1986 Bond Resolution, this reserve is required to be the lesser of the maximum principal and interest requirements for any bond year or 125 percent of the average annual principal and interest requirements for the bonds. Legal requirements for this fund for the proposed FY 2016 budget include \$5,870,975 for the 2014 Sewer Revenue Refunding Bonds, \$5,173,418 for the 2012 Sewer Revenue Bonds and \$9,654,775 for the 2009 Sewer Revenue Bonds. Based on the adopted FY 2016 budget plan, the current balance of \$21,728,541 is sufficient to meet these requirements and no additional funding was projected to be required for Fund 69030 in FY 2016.

Fund 69040 – Sewer Bond Subordinate Debt Service

Fund 69040 *Sewer Bond Subordinate Debt Service*, was created in FY 1992 to keep separate all debt-service payments associated with the UOSA Revenue Bonds, the Virginia Resources Authority (VRA) loans and the Manassas Park debt payment. The UOSA debt covers the County's portion of the cost of UOSA's plant expansion to 54 mgd. Two VRA loans which were used to fund the County's share of costs for AlexRenew Enterprise's ammonia removal upgrade are also supported with Fund 69040.



The UOSA Board is currently amending their Service Agreement to allow member jurisdictions to pay cash for their portion of CIP costs and avoid participating in future UOSA bond sales. Based on available sewer revenues, Fairfax County may be able to take advantage of this option and avoid debt service costs. Fairfax County's share of the next scheduled UOSA bond sale is projected to be \$13 million. As part of the FY 2014 Carryover Review, the Board of Supervisors approved an increase of \$13 million to Fund 69300, Sewer Construction Improvements, necessary to fund Fairfax County's portion of the CIP related to the UOSA treatment plant upgrades using cash on hand rather than incurring debt. Taking advantage of this cash option will save the County approximately \$14 million in debt service interest payments over a 30-year period.

An amount of \$26,318,820 is proposed for this fund in FY 2016 including \$20,115,543 for principal and interest obligations for the UOSA facility and \$6,203,277 for principal and interest payments on the VRA loans.

Fund 69300 – Sewer Construction Improvements

Fund 69300 *Sewer Construction Improvements*, provides for sewer system construction, upgrades, extension and improvement projects that are funded by system revenues (Fund 69000). This fund includes the costs associated with rehabilitation of pump stations and force mains, integrated sewer metering, collection system extension, improvement, replacement and rehabilitation, large diameter pipe replacement and rehabilitation, funding of the sewer sag program, and upgrade/rehabilitation at NMCCP and the County's pro rata share of wastewater flow to treatment-by-contract (see Section 2.8). For FY 2016 \$86,389,000 is proposed to provide funding for twelve projects.

Fund 69310 – Sewer Bond Construction

Fund 69310 *Sewer Bond Construction*, was established in FY 1987 to provide bond funding for major expansions and improvements to existing wastewater treatment facilities utilized by Fairfax County residents. In recent years, funding has been provided from this fund for nitrogen removal and plant upgrades for the County's share of wastewater flow to treatment-by-contract facilities (see Section 2.8). Funding is supported via revenue bonds from Fund 69310 Sewer Bond Construction or by cash from Fund 69300 Sewer Construction Improvements.

On July 24, 2012, \$105,800,000 in revenue bonds were issued to support capital projects including enhanced nutrient removal facilities, replacement and rehabilitation of sewer lines, plant

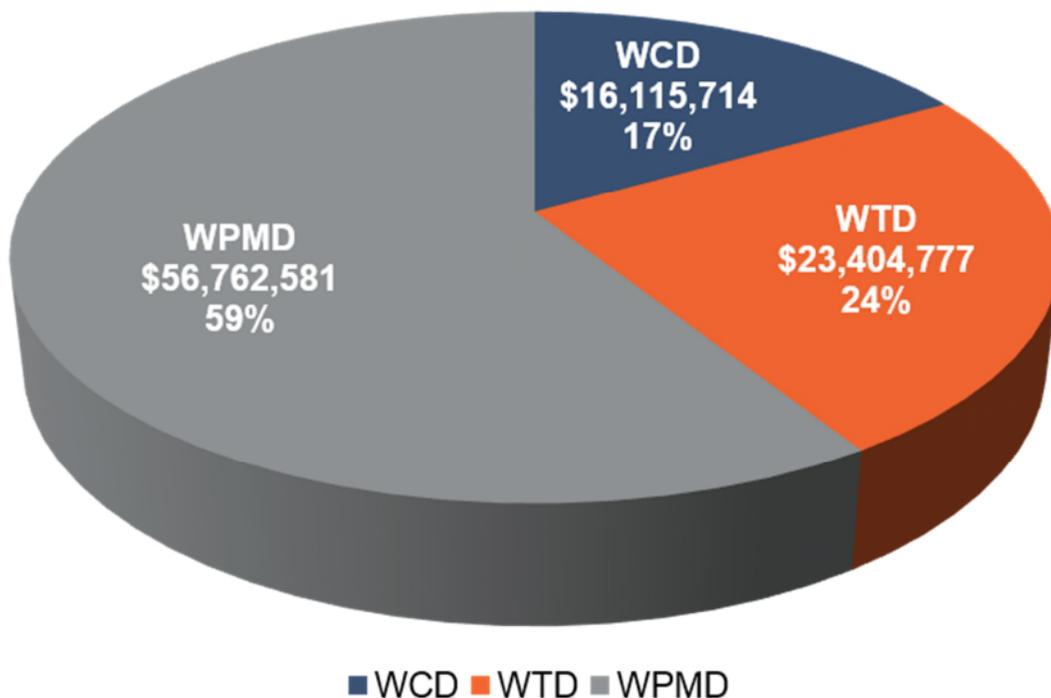


upgrades at the NMCPCP and upgrades at treatment-by-contract facilities, including \$100,700,000 in Fund 69310 and \$5,100,000 million reserved in Fund 69030. Funding adjustments were made as part of the FY 2014 Carryover Review. In FY 2015 funding of \$31,510,145 was approved due to carryover of unexpended project balances. In FY 2015 a total revenue of \$10,829,276 was anticipated. The FY 2016 Budget assumes a transfer of \$13,000,000 from Fund 69000 based on the availability of cash to pay for construction at the NMCPCP. No additional revenue sources are budgeted for FY 2016.

3.2 Wastewater Management Program Budget

A total budget of \$96,283,072 is proposed in Fund 69010 for the FY 2016 operations and maintenance of the Wastewater Management Program. This budget is split between the three Divisions, with treatment-by-contract included under WPMD, as shown in Figure 3-1.

Figure 3-1: FY 2016 Adopted Budget by Division



Note: WCD – Wastewater Collection Division, WTD – Wastewater Treatment Division, WPMD – Wastewater Planning and Monitoring Division



The County has continued to improve its budget process by providing clear goals, overviews, objectives, and performance indicators for each agency. The County now tracks sixteen performance indicators for the Wastewater Management Program on an annual basis, thereby enabling the County to measure criteria directly related to the quality of service provided to its customers, as well as to develop a database upon which strategic analyses and intelligent decisions can be made. Indicator estimates for FY 2014 and FY 2015 follow trends established in previous years, with service quality indicators remaining high and costs generally staying level or increasing slightly with time.

The FY 2015 operations fund amounts, compared to FY 2014 amounts are shown in the Wastewater Management Program FY 2016 Adopted Budget Plan in Table 3-1. The budgeted amounts by Division for FY 2016 are comparable to those in previous years, considering inflationary impacts to operational expenses.

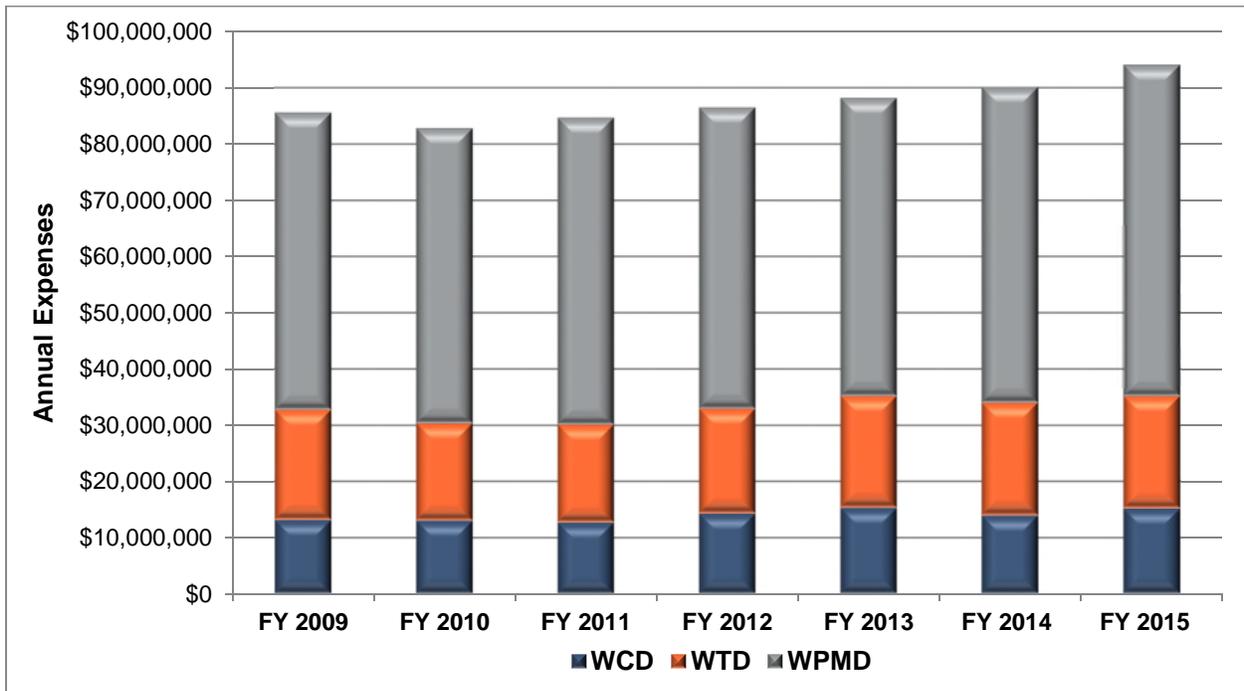
Table 3-1: Wastewater Management Program FY 2015 Budget

Cost Center	FY 2014 Actual	FY 2015 Actual	FY 2016 Adopted Budget Plan
Wastewater Collection Division (WCD)	\$13,838,876	\$15,077,093	\$16,115,714
Wastewater Treatment Division (WTD)	\$20,104,845	\$20,032,600	\$23,404,777
Wastewater Planning and Monitoring Division (WPMD; includes TBC)	\$56,140,017	\$58,906,639	\$56,762,581
Total	\$90,083,738	\$94,016,332	\$96,283,072

Budgets for other cost centers are also consistent with previous fiscal years. Budgets for all cost centers appear to be reasonable and adequate for the Wastewater Management Program to perform its assigned functions. The expense history of the Wastewater Management Program reflects the stability and cost consciousness of the organization. Figure 3-2 illustrates long-term trends in actual Operations and Maintenance expenditures of the Wastewater Management Program and its divisions, not adjusted for inflation. Despite increases in the cost of living and other expenses, many costs continue to remain very stable. Gradually increasing cost trends for WCD and WTD are generally driven by personnel costs, and trends in WPMD costs are driven by treatment-by-contract (TBC) and billing agent fees (BAFs).



Figure 3-2: Wastewater Management Program O&M Expenses



Note: WPMD expenses include treatment-by-contract expenses



Section 4 Capital Improvement Program FY 2016 - FY 2020

4.1 Capital Improvement Program (CIP)

The CIP is updated every year and is linked strategically to the Fairfax County Comprehensive Plan and the County's Budget. It is a five-year roadmap that addresses the Wastewater Management Program's needs relating to the acquisition, expansion and rehabilitation of facilities and systems. It serves as a planning instrument to identify needed capital projects and to coordinate the financing and timing of improvements to utilize financial resources in a responsive and efficient manner. It is considered a "blueprint" for the future of the community and is used as a dynamic tool, rather than a static document.

The underlying strategy of the CIP is to plan for land acquisition, construction and maintenance of public facilities necessary for the safe and efficient provision of public services in accordance with broad policies and objectives adopted in the County's Comprehensive Plan. In keeping with this strategy, the primary goals of the Wastewater Management Program's CIP are summarized as follows:

- Provide treatment facilities that meet applicable effluent discharge standards using state-of-the-art technology in the most cost-effective manner possible.
- Provide a system of conveyance and treatment facilities that can accommodate projected residential and nonresidential growth over the planning period.
- Renovate and improve facilities to maintain a high level of efficiency, ensure cost-effective long-term operations and provide a sufficient level of service.
- Extend the sewer service within approved areas to those sections of the County where failed or failing septic systems pose a potential threat to the health of County citizens.

While the CIP serves as a long range plan, it is reviewed semi-annually and revised based on current circumstances and opportunities. Priorities may change due to funding opportunities or circumstances that cause a more rapid deterioration of a particular asset. Projects may be revised for significant costing variances as the needs of the community become more defined and projects move closer to final implementation. The adoption of the CIP is neither a commitment to a particular project nor a limitation to a particular cost. Moreover, it is a basic tool for scheduling anticipated capital projects and capital financing and is a key element in planning and controlling future debt service requirements.



4.2 CIP Funding

Financing of the CIP is derived from three sources: current system revenues, the sale of revenue bonds, and grant funding. The Wastewater Management Program generally uses current system revenues on a “pay as you go” basis to fund the majority of capital improvements. This has particularly been true for “recurring” capital projects, such as capital replacement and rehabilitation projects, extension and improvement (E&I) projects and general system improvement projects. For major capital initiatives such as system expansion and regulatory compliance projects, projects have been funded through the use of sewer revenue bonds that are payable solely from the revenues of the Integrated Sewer System.

The Wastewater Management Program actively manages its outstanding debt by refinancing to take advantage of lower interest rates or retiring debt to manage its debt service coverage. While federal and state grants were extensively utilized to fund the construction programs of the 1970s and 1980s, the financial burden of future programs will fall heavily on the County due to scarcity of federal grant funds. While grant funding options are still being pursued, the Wastewater Management Program has conservatively assumed that no state or federal grant funding will be available to help offset the cost of compliance with the Chesapeake Bay Program.

In FY 2016 proposed increases to both the Sewer Service Charge and Base Charge will change the annual average customer bill from \$540.08 in FY 2015 to \$559.40 in FY 2016, a cost increase of \$19.32 or 3.6 percent. The Sewer Service Charge will increase from \$6.62 to \$6.65 per 1,000 gallons of water consumed, based on Fairfax County’s winter quarter average consumption of 18,000 gallons. The Base Charge will increase from \$15.86 per quarter to \$20.15 per quarter. The Base Charge provides for a more equitable rate structure by recovering a portion of the program’s fixed cost.

As discussed in Section 1 the County issues sewer revenue bonds to provide funds for expanding treatment facility capacity at both County-owned and County-contracted facilities. To date, the County has issued revenue bond debt for the following treatment plant expansions:

- In July 1996, \$104 million in revenue bond debt to support the expansion from 54 (mgd) to 67 mgd at the NMCPCP. These bonds were refunded in October 2004.
- In June 2001 and June 2002, a total of \$90 million in State Revolving Fund/Virginia Resources Authority debt was issued to support the County’s share of plant upgrades at the AlexRenew Enterprises treatment plant.



- In July 2009, \$152.3 million in revenue bond debt was issued to support the County's share of the plant upgrades at DC Water, Arlington County, AlexRenew Enterprise as well as the County owned treatment plant to comply with the nitrogen discharge limits as defined in the Chesapeake Bay Program.
- In August 2012, \$100.7 million in revenue bond debt was issued to support the County's share of the plant upgrades at DC Water, AlexRenew Enterprises as well as the County owned treatment plant to comply with the enhanced nutrient discharge limits as defined in the Chesapeake Bay Program.
- In April 2014, the County took advantage of lower market interest rates and issued \$61.7 million of Sewer Revenue Refunding Bonds to refund the remaining \$69.7 million of the outstanding Series 2004 Bonds.

In addition to this County-issued debt, as of June 30, 2015, the County was responsible for \$265.7 million in debt to support the expansion and upgrade of the UOSA treatment plant.

4.3 Historical CIP Trends

An overview of historical trends in the Wastewater Management Program's CIP spending provides an understanding of the changing priorities and relative costs of various categories of capital improvements over time. Figure 4-1 shows historical CIP construction activity for the last nine years, categorized by the type of project:

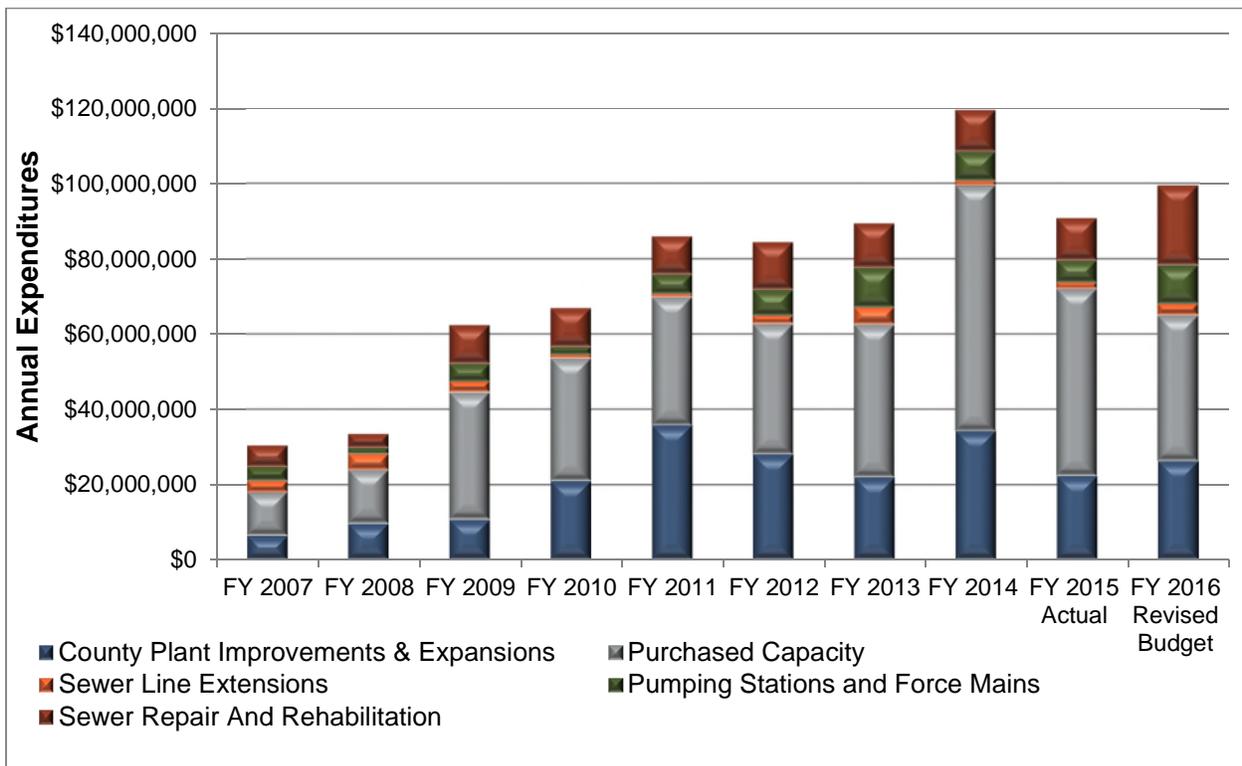
- County plant improvements and expansions
- Projects associated with purchased capacity
- Sewer line extensions
- Pump stations and force mains
- Sewer repair and rehabilitation

Costs associated with purchased capacity (treatment-by-contracts) are the primary component of CIP spending in recent years. FY 2007 through FY 2008 represent a relatively low spending period following the completion of the main plant improvements at NMCP and a major Blue Plains improvement project, while FY 2009 represented the increased costs on improvements to the purchased capacity facilities. The trend for expenditures on plant improvements continued in FY 2010 as did the trend for expenditures on rehabilitating and extending the sewer system. The graph shows a nearly threefold increase in expenditures on pumping station rehabilitation starting in FY 2009. These investments focused on the continual replacement, rehabilitation and upgrades



to the numerous pumping stations in the System which continued through FY 2012. The graph also shows that expenditures on NMCCPCP improvements doubled in FY 2010 and continued to increase in FY 2011 corresponding with the ongoing Limit of Technology (ENR) improvements. Total spending in FY 2013 was similar to total spending in FY 2011 and FY 2012, but with slight increases in projects associated with the purchased capacity facilities and decreases in spending on the NMCCPCP improvements. In FY 2014, there was a large increase in total spending, with the largest increases in projects associated with the purchased capacity facilities and the NMCCPCP improvements. Actual spending decreased in FY 2015 as many capital projects in the design phase did not progress to the construction phase as anticipated during budget preparation. As such, the FY 2016 revised budget exceeds the FY 2015 spending.

Figure 4-1: Sewer Fund Historical Construction Activity



4.4 CIP Development Process

The County’s CIP development process for current and future projects involves:

- 1) Compiling requested 5- and 10-year CIP projects from WCD and WTD.
- 2) Obtaining Treatment by Contract budgets from other jurisdictions.



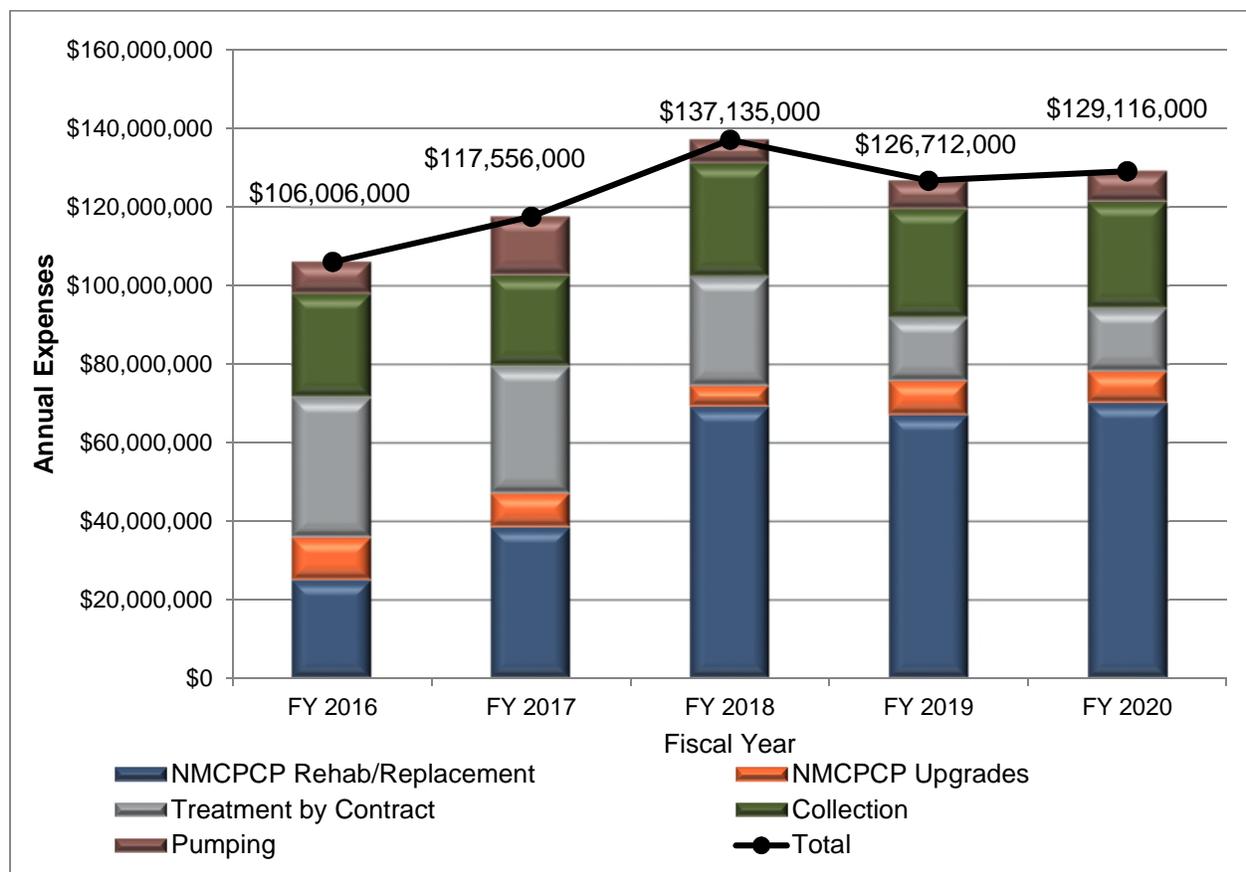
- 3) Determining initial program affordability and impact on system rates.
- 4) Identifying projects that can be deferred to lessen the financial impact.
- 5) Developing revised general 5- and 10-year CIP and next fiscal year's capital budget.

The County continues to use a dynamic CIP development process whereby County staff continually re-assess capital program needs, prioritization and affordability.

4.5 Overview of Five-Year CIP Projects

The five-year CIP for FY 2016 - 2020 for the Wastewater Management Program was reviewed for this report. The five-year CIP includes treatment, collection and pumping projects totaling approximately \$616 million. Figure 4-2 below summarizes the requested five-year CIP for FY 2016 - FY 2020 on a cash flow basis. The requested CIP projects and budgets are described in this section, categorized by major project type.

Figure 4-2: Proposed Five-Year CIP on a Cash Flow Basis





4.5.1 Wastewater Treatment Division Projects

Noman M. Cole, Jr. Pollution Control Plant Construction Rehabilitation and Replacement

These projects include the continued rehabilitation of the plants assets through FY 2020. Proposed projects include: replacement of the existing biosolids facilities; replacement of the motor control centers and electrical distribution center; ash system improvements: rehabilitation and replacement of the miscellaneous pumps, gates, and valves; rehabilitation of the grit removal facilities; rehabilitation of the disinfection facilities; stormwater runoff improvements; and Pohick Creek stabilization. The estimated cost for the rehabilitation and replacement construction in FY 2016 - FY 2020 is \$269,179,000.

Noman M. Cole, Jr. Pollution Control Plant Upgrades

This funding will be used to upgrade the plant with state-of-the-art technology required to meet nitrogen removal compliance associated with the Chesapeake Bay Program. Specific projects include rehabilitation of the filter processes, equalization basin improvements, and rehabilitation of the solid thickening facilities. The estimated project cost for these upgrades in FY 2016 - FY 2020 is \$41,638,000.

4.5.2 Treatment by Contract Projects

Alexandria Renew Enterprises Advanced Waste Treatment Facility (AWTF) Improvements

This project provides for Fairfax County's 60% share of construction costs associated with improvements at the AlexRenew AWTF. Specific projects include: improvements to carbon adsorption, scum collection, dechlorination and limit of technology nitrogen removal compliance. Two low interest loans from the State Revolving Fund were used to fund the project and debt service costs for these loans are funded through sewer reserves. The estimated project cost for the AlexRenew ATWF improvements in FY 2016 - FY 2020 is \$64,854,000.

DC Water Blue Plains AWTP Upgrade

This project funds Fairfax County's 8.4% share of the costs of upgrading the DC Water Blue Plains Advanced Wastewater Treatment Plant through 2020. The upgrades include renovations to the chemical addition facilities to meet lower total nitrogen limits, flow control tunnels, and new solids processing and disposal systems. FY 2016 – 2020 project cost for the Blue Plains AWTP improvements are \$33,366,000.



Arlington WWTP Upgrade

This project was developed to fund Fairfax County's share of the costs associated with upgrading the Arlington WWTP to meet the 1 ppm ammonia-nitrogen discharge to comply with the Chesapeake Bay Program and was completed in 2012. Current and future funding will provide for the rehabilitation and replacement of existing facilities based on age and remaining service life. FY 2016 - FY 2020 project costs for the Arlington WWTP rehabilitation and replacement are \$3,818,000.

Upper Occoquan Service Authority Treatment Plant Upgrade

This project provides for Fairfax County's 41.8% share of costs associated with improvements at the UOSA Treatment Plant. Specific projects include: renovations related to nutrient discharge limitations, filter press replacement, and re-carbonation clarifier improvements. FY 2016 - FY 2020 project costs for the UOSA Treatment Plant are \$25,990,000.

4.5.3 Wastewater Collection Division Projects

Sanitary Sewer Replacement, Rehabilitation and Upgrade Program

This is a continuing project for replacement, repair and rehabilitation of sewer lines. FY 2015 marked the initiation of efforts to address repair of large diameter sewer lines to prevent future pipe failures. FY 2016 - FY 2020 project costs for sanitary sewer projects are projected to be \$115,708,000.

Pumping Station Improvements

This continuing project was established to fund replacement and necessary improvements to address such items as normal wear and tear and odor control at the sewage pumping stations County wide. The goal of these improvements is not to increase capacity at the pump stations but to address continual rehabilitation and equipment upgrade needs or improve the stations to address service issues such as odor control. This project includes the rehabilitation of the Difficult Run Pump Station, that requires rehabilitation to meet the flow needs for projected redevelopment in the Tysons corner area. A total of \$44,398,000 has been budgeted for pumping station improvements in FY 2016 - FY 2020.

Sewer System Capital Renewal

Renovation improvements planned for the Robert P. McMath facility from FY 2016 - FY 2020 are necessary to meet the Program's operational needs. Improvements include upgraded outdoor



lighting, reconfiguring office space, HVAC upgrades, and miscellaneous facility rehabilitation. Future improvements will include Supervisory Control and Data Acquisition (SCADA) Backup System, various safety improvements at all collection facilities and smaller miscellaneous improvements. A total of \$2,475,000 has been budgeted for the Robert P. McMath Facility rehabilitation project and other miscellaneous facility rehabilitation for FY 2016 - FY 2020.

Sewer Metering Projects

Installation and rehabilitation of sewer meters is necessary to obtain billing data and identify excessive inflow and infiltration. Sewer flow data is required by the State Water Control Board and the Environmental Protection Agency. A total of \$100,000 is allocated to install and rehabilitate sewer meters in FY 2016.

Sewer Extension and Improvement Projects

This is a continuing project to complete sewer extension and improvement project in sewer service areas of the County that are experiencing chronic septic system failures. \$15,000,000 has been allocated for extension and improvement projects in FY 2016 - FY 2020.

4.6 CIP Conclusions

The adopted CIP addresses the anticipated capital needs of the Wastewater Management Program for FY 2016 - FY 2020. Upgrades and improvements to the NMCPCP, as well as inter-jurisdictional wastewater treatment facilities, required to meet growth and new regulatory requirements, have been included in the five-year CIP budget.

The annual CIP projects necessary to upgrade/rehabilitate the collection system pumping stations, buildings and sewer lines are critical to maintaining system integrity and increasing reliability. Proactive, rather than reactive, rehabilitation and maintenance projects are instrumental in avoiding costly emergency response projects resulting from system failures. These initiatives allow the County to continue to meet its goals of having an efficiently operated and effectively maintained wastewater system.



Section 5 Current and Future Rates and Revenues

5.1 Rates and Revenues

Rates and revenues are reviewed during the County's annual budget cycle to ensure compliance with the Board of Supervisors' adopted policy that "growth pays for growth." The County utilizes an outside consultant to evaluate the adequacy of sewer service charges and availability fees to recover the costs associated with the Wastewater Management Program. In general, these costs include:

- Capital costs
- Operation and maintenance costs
- Debt service costs

To examine the rates and revenues in place to fund the Wastewater Management Program, Hazen and Sawyer reviewed the Program's FY 2015 Comprehensive Annual Financial Report (CAFR), the FY 2015 Annual Disclosure Report and the Wastewater Revenue Sufficiency and Rate Analysis Forecast Period Fiscal Year 2016 Through Fiscal Year 2021.

The financial statements of the County of Fairfax, Virginia Integrated Sewer System (the System) for the years ended June 30, 2015 as presented in the FY 2015 CAFR were audited by an independent auditor, KPMG LLP, a firm of licensed certified public accountants. KPMG concluded the following regarding these statements:

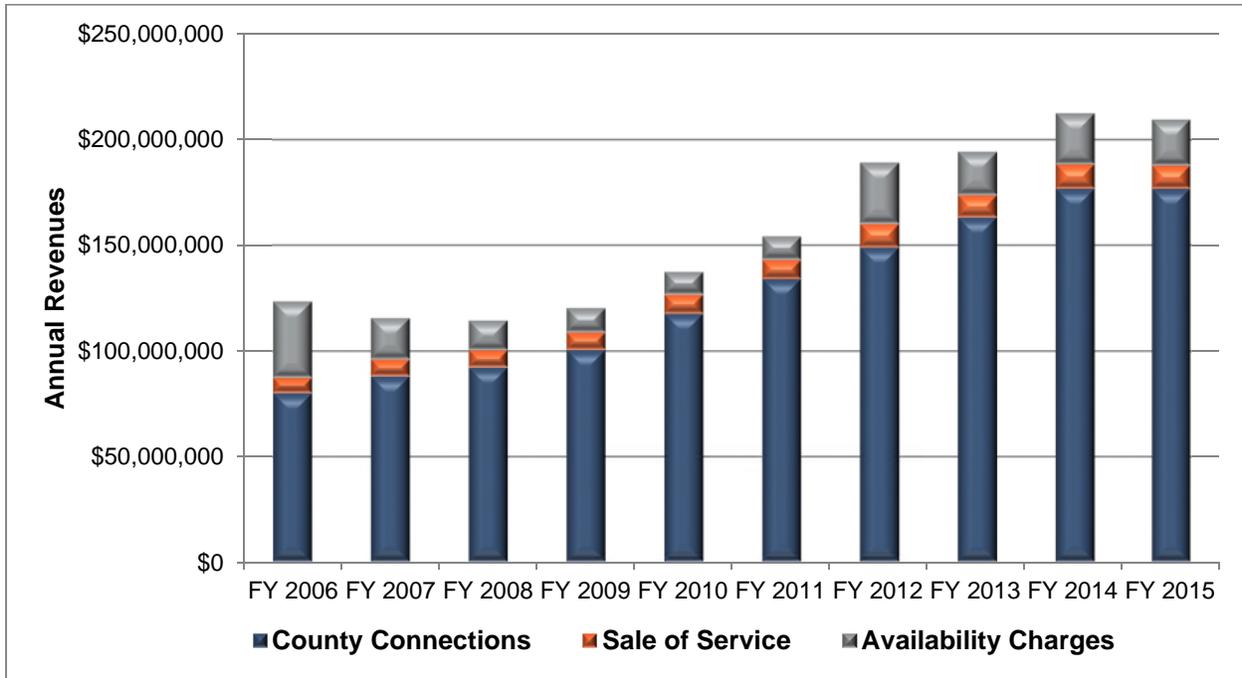
"In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of Integrated Sewer System, an enterprise fund of the County of Fairfax, Virginia as of June 30, 2015, and the respective changes in financial position, and, cash flows thereof for the years then ended in accordance with U.S. generally accepted accounting principles."

The Wastewater Management Program operation and maintenance, debt service and capital projects (other than those funded by revenue bonds) are funded through availability fees and sewer service charges adopted by the County's Board of Supervisors. For FY ended June 30, 2015, approximately 94% of the Wastewater Management Program's revenues are derived from charges to new and existing customers through sewer service charges and availability fees. The remaining 6% of system revenues are derived primarily from sale of service to wholesale users such as Arlington County, Fort Belvoir, the Cities of Fairfax and Falls Church



and the Towns of Herndon and Vienna. The breakdown of system revenues for the previous ten fiscal years is shown in Figure 5-1.

Figure 5-1: Historical Annual Wastewater Management Program Revenues by Source



The Wastewater Management Program uses extensive flow monitoring data to allocate costs based on percentage of flow capacity which is attributed to existing and new customers. Sewer service rates and availability fees are established by the Fairfax County Board of Supervisors. Sewer rates are reviewed and revised annually as part of the County's annual strategic planning and budgeting process to minimize the annual cost impact on customers due to increases in funding needs for the Wastewater Management Program. Sewer service charges are assessed to existing customers to recover operation and maintenance costs and debt service payments. These charges also provide capital project funding attributable to supporting or improving wastewater treatment services to existing customers.

Since 2010, the Board has used the five-year financial projections of financial performance measures to determine the appropriate level of availability, sewer service and base charges. The Wastewater Management Program allocates operating expenses, capital funding allowance and total debt service payments based on the operating revenues and income.

System operations and financial capability is currently affected by several factors, including increased near term capital expenditures, the lingering effects of the economic downturn (which



have impacted cash flow and overall capital funding needs), the continued effects of increased cost of operations and construction and the need to maintain a strong financial position in the market. Maintaining financial strength is necessary in order to attract future capital as well to maintain competitive rates over the long-term and meet the rate covenants as delineated in the General Bond Resolution, the VRA financing agreements and other loan agreements that authorize the issuance of the Outstanding Bonds and other loans for the system.

In addition to the expenditure cost on its own system, the County (as prescribed by each agreement with the four purchased capacity entitlements of non-County facilities) is required to pay for its share of the operating, capital and/or debt costs of each entity's system based on actual wastewater flows and allocated capacity. Capital expenditures to meet the Chesapeake Bay Program effluent discharge standard for all of the facilities have increased significantly. Along with these expenditures, the need to continually perform necessary renewals, replacements and betterments as a result of the facilities reaching the end of their useful service lives will continue to add to these expenses.

Since FY 2006, the average growth in the County's wastewater customer base has averaged approximately 0.7% annually, but because of water conservation efforts the total wastewater generated in the County service area has an average growth rate of -0.5% annually, with a range of -7.8% to +7.1%. The billed wastewater flow is based on metered water sales at the customer premises. Many factors can affect billed wastewater flow, such as:

- Continued water conservation measures which are affecting previous development (retrofit of old plumbing fixtures).
- New development (required to install low flow fixtures).
- Rainfall effects on overall average flow generations, including both annual variations in rainfall amounts and I/I as impacted by the physical condition of the collection system. It should be noted that I/I only impacts wholesale customers not residential or commercial customers.
- Overall reduced household size and effects of the continued sluggishness in the regional economy (foreclosures and reduced customer consumption for economic reasons by a customer).

Wastewater flow forecasts assume increases primarily in proportion to the customer growth, but also project the average billed flow per connection to decline. Previous forecasts assumed a reduction in growth; however, the actual reductions in growth have been steeper than expected.



Although there was some growth in FY 2014, this was not observed in FY 2015 and it is projected that growth of the customer base will continue to fall short of historical trends. The net effect of this reduction in customer growth is rate revenues and availability fee receipts from new customer additions will be lower. However, the ability to reduce or defer capital projects in relation to this reduction in customer and revenue growth is not feasible since the majority of the capital expenditure is associated with regulatory compliance initiatives that must be funded regardless of the customer base served (i.e., reduced nitrogen discharges requiring methanol addition, per the Chesapeake Bay Program requirements).

Some significant development is likely to result in association with the ongoing transportation projects in the Tyson's Corner area and along the new Metro rail line towards Dulles Airport. This development will require expanded or additional facilities for service. These growth areas have been identified with projects in the five-year CIP and availability fees have started to be received for a portion of this development. Other sources of revenue are projected to remain flat due to a continued slow addition of new development projects and moderate population growth in the County, relative to the last two decades. The Program may also use sewer fund balances to partially offset the burden of higher operating costs, based on proposed revenue requirements. The County has studied the necessary funding requirements for the planning period and has established rates and charges as described in the following sections.

5.2 Rates

Stringent effluent requirements for wastewater treatment plants have resulted in significant expenditures to upgrade these facilities. This trend is expected to continue in the near future. As a result, the Sewer Service Charge will increase over the next five-years from \$6.62 per 1000 gallons in FY 2015 to \$ 6.65 per 1000 gallons in FY 2016. (for more information on the history of sewer service charges fees, refer to Appendix B).

With the goal to improve revenue stability of the system, and based on existing and projected requirements, the County previously identified the need to recover a greater portion of the fixed costs in a constant charge for service as opposed to the recovery of costs solely based on the volumetric rates. Along with the variable-fee mechanism of charging based on wastewater flow, beginning in FY 2013 the County adopted a fixed cost recovery mechanism of charging for service. In FY 2015 the base fee was \$15.89 per billing period and the base fee will increase to \$20.15 per billing period in FY 2016.



As shown in Appendix B, volumetric rates will steadily increase in future years and the fixed-fee base charge will continue to be charged to all accounts. The realities of the Wastewater Management Program finances will allow the rate increases to be reduced over the five-year planning period assessed by the County. Current revised projections for service charge rate increases are 1.0% for FY 2015 and 0.5% for FY 2016. Billing charge modifications scheduled for the next five years are necessary to accommodate administrative cost increases for the billing process and to recover a portion of the Program's fixed costs. These increases are necessary to fund upcoming CIP projects and also account for the existing economic conditions.

5.3 Availability Fees

The availability fee is a one-time charge assessed to new customers to recover the proportionate share of system costs and capital project funding attributable to expansion of the system required to support new customers. Existing customers are defined as those who have paid an availability fee for access to the system. Existing customers include those who are connected to the system and are receiving wastewater conveyance and treatment services as well as those who have paid an availability fee but are not yet receiving services. New customers are those who have yet to pay the availability fee. Upon payment of the availability fee a new customer becomes an existing customer.

The County's availability fee methodology is based on the "growth-related" or marginal/incremental cost method. Under this method, the availability fee is designed to recover the incremental costs of facility capacity constructed to meet the needs of new development. The County's availability fee calculation is based on a utility industry accepted methodology and meets the County's standards for availability fee development ensuring that "growth pays for growth". Based on current financial forecasts, an availability fee per single family residential equivalent (SFRE) of \$7,750 will remain unchanged (for more information on the history of availability fees, refer to Appendix B).

5.4 Bond Issues

To fund construction of upgraded and expanded treatment facilities needed to meet more stringent discharge standards and projected future capacity requirements, the County will continue to issue Sewer Revenue Bonds as needed. Future bond issuances will enable the County to have funds available to pay for needed projects and reduce impact on sewer service charges by spreading the costs over an extended period of time. In FY 2014, the County issued



\$63 million Sewer Revenue Refunding Bonds. Moody's Investor Service assigned an Aaa rating to the Series 2014 Bonds for an estimated net present value savings of 11.3% of the principal. Bonds were not issued in FY 2015 and are not scheduled for issue in FY 2016.

5.5 Financial Position

In evaluating the financial position of the Wastewater Management Program, two criteria are used to assess the financial stability of the system: (1) the ability to meet the debt service coverage requirements in the General Bond Resolution for Sewer Revenue Bonds, and (2) the ability to provide adequate cash flow for operation and maintenance expenses as well as capital requirements.

The County's 2009 General Bond Resolution requires that rates be set such that new revenues, excluding availability fees and other one-time sources, provide debt service coverage of at least 1.25 times debt service on senior obligations. This was implemented to reduce the Program's dependence on availability fees, a non-recurring revenue source that creates vulnerability for the system and increased reliance on service charges and new billing fees. This bond resolution governs the system's debt, including previously issued obligations. Table 7 in Appendix C indicates that revenues will be sufficient to ensure that this requirement will be met for the forecasted period of FY 2016 - FY 2021. Based on the service charge and availability fee schedule and associated financial statements, total revenue bond and senior (parity) debt coverage ratios will range from 2.94 to 4.62 during the forecast period. Overall debt service coverage ratios also are forecasted to remain above 1.00 throughout the forecast period, with values ranging from 1.82 to 2.05. Table 12 in Appendix C indicates that there will be sufficient cash flow to fund operation and maintenance as well as capital projects, with sufficient fund balances within the various funds to cover projected expenditures and maintain adequate reserves.



Appendix A – Results of FY 2015 Accountable Equipment Site Visit



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County of Fairfax, Virginia

MEMORANDUM

DATE: June 30, 2015

TO: Thomas Russell, Director
Wastewater Collection Division

FROM: Cathy A. Muse, CPPO, Director *Cathy A. Muse*
Department of Purchasing & Supply Management

SUBJECT: Results of FY15 Inventory Management Site Visit

REFERENCE: Procedural Memorandum No. 12-06, "Consumable Inventory Management Program"

Tyler Carey, Inventory Auditor, conducted an inventory management site visit of the Wastewater Collection Division, Line Maintenance stockroom on May 27, 2015, as prescribed in the referenced procedural memorandum. The initial results were verified with the stockroom supervisor, Trina Sanders, in order to determine if there was a need to conduct any additional review.

I commend you and your staff for exceeding Fairfax County standards:

Inventory Accuracy:	100.00% (County standard 97% and above)
Gross Value Adjustment:	0.00% (County standard 0.75% and below)

A sample of 35 items, valued at \$409,941.30, was selected from your Consumable Inventory for review. All the items were accounted for. In addition, the stockroom staff was efficient and a pleasure to work with.

If you have any questions concerning the results of this inventory, please contact Tyler Carey at 703-658-3823. Your cooperation in this matter is appreciated.

cc: Charese Willis, Manager
DPWES – Wastewater Planning & Monitoring Division

Trina Sanders, Stockroom Supervisor
DPWES – Wastewater Collection Division

Tyler Carey, Inventory Management Analyst II
Department of Purchasing & Supply Management

Department of Purchasing and Supply Management
12000 Government Center Parkway, Suite 427
Fairfax, VA 22035

Website: www.fairfaxcounty.gov/dpsm
Phone: 703-324-3201, TTY: 1-800-828-1140, Fax: 703-324-3681



County of Fairfax, Virginia

MEMORANDUM

DATE: June 30, 2015

TO: Michael McGrath, Director
Wastewater Treatment Division

FROM: Cathy A. Muse, CPPO, Director *Cathy A. Muse*
Department of Purchasing & Supply Management

SUBJECT: Results of FY15 Inventory Management Site Visit

REFERENCE: Procedural Memorandum No. 12-06, "Consumable Inventory Management Program"

Tyler Carey, Inventory Auditor, conducted an inventory management site visit of the Wastewater Treatment Division, Lower Potomac stockroom on May 22, 2015, as prescribed in the referenced procedural memorandum. The initial results were verified with the stockroom supervisor, Cliff Davis, in order to determine if there was a need to conduct any additional review.

I commend you and your staff for exceeding Fairfax County standards:

Inventory Accuracy:	100.00% (County standard 97% and above)
Gross Value Adjustment:	0.00% (County standard 0.75% and below)

A sample of 35 items, valued at \$24,308.69, was selected from your Consumable Inventory for review. All the items were accounted for. In addition, the stockroom staff was efficient and a pleasure to work with.

If you have any questions concerning the results of this inventory, please contact Tyler Carey at 703-658-3823. Your cooperation in this matter is appreciated.

cc: Charese Willis, Manager
DPWES – Wastewater Planning & Monitoring Division

Cliff Davis, Warehouse Supervisor
DPWES – Wastewater Treatment Division

Tyler Carey, Inventory Management Analyst II
Department of Purchasing & Supply Management

Department of Purchasing and Supply Management
12000 Government Center Parkway, Suite 427
Fairfax, VA 22035

Website: www.fairfaxcounty.gov/dpsm
Phone: 703-324-3201, TTY: 1-800-828-1140, Fax: 703-324-3681



Appendix B – Fees and Charges

Sewer Service Charges

Purpose

To change existing customers of the Wastewater Management Program for system operation and maintenance costs in proportion to services provided.

Rate History (Sewer Service Charges)

Since 2005, the Wastewater Management Program has increased the Sewer Service Charge rates as follows:

Sewer Service Charge Rates				
Fiscal Year	Service Charge (\$/1000 gal)	Percent Increase	Base Charge (\$/Qtr/ERC)	Percent Increase
2005	\$3.20	5.6%	-	-
2006	\$3.28	2.5%	-	-
2007	\$3.50	6.7%	-	-
2008	\$3.74	6.9%	-	-
2009	\$4.10	9.6%	\$5.00	-
2010	\$4.50	9.8%	\$5.00	0.0%
2011	\$5.27	17.1%	\$5.00	0.0%
2012	\$6.01	14.0%	\$5.00	0.0%
2013	\$6.55	8.9%	\$5.50	10.0%
2014	\$6.55	0%	\$12.79	132.5%
2015	\$6.62	1.1%	\$15.86	24.0%

Source: FY 2015 Comprehensive Annual Financial Report

Rate Increase (Sewer Service Charges)

The table below shows current and forecasted Sewer Service Charge rates for the years from FY 2015 through FY 2020. The service charge has remained the same at \$6.55/1000 gallons since it became effective on July 1, 2012. The additional base per billing (quarterly) for all users took effect July 1, 2009. The initial base charge was \$5.00 per quarter. The base charge increased to \$15.86 per quarter for FY 2015. The projected rates shown in the table below



reflect rate increases based on the current financial status and projections for the upcoming five years.

Current and Forecasted Sewer Service Charge Rates FY 2015 through FY 2021				
Fiscal Year	Service Charge (\$/1000 gal)	Percent Increase	Base Charge (\$/Qtr/ERC)	Percent Increase
2015	\$6.62	1.0%	\$15.86	24.0%
2016	\$6.65	0.5%	\$20.15	27.0%
2017	\$6.68	0.5%	\$24.68	22.5%
2018	\$6.75	1.5%	\$27.62	11.9%
2019	\$6.85	3.0%	\$30.38	10.0%
2020	\$7.05	3.0%	\$33.42	9.0%
2021	\$7.21	2.3%	\$36.7	9.8%

Source: Wastewater Revenue Sufficiency and Rate Analysis Report FY 2016 through FY 2021

Availability

Fee Purpose

To charge new customers of the Wastewater Management Program for the costs created by the growth and expansion of the system needed to accommodate new customers.

Rate History (Availability Fee)

The following table shows the historical availability fees by customer class for the period from FY 2005 through FY 2014:

Historical Availability Fees by Customer Class					
Fiscal Year	Single Family Residence	Townhouse or Apartment	Hotel/Motel (per unit charge)	Mobile Home	Non- residential (per fixture unit)
2005	\$5,621	\$4,497	\$1,406	\$4,497	\$291
2006	\$5,874	\$4,699	\$1,469	\$4,699	\$304
2007	\$6,138	\$4,910	\$1,535	\$4,910	\$318
2008	\$6,506	\$5,205	\$1,627	\$5,205	\$337
2009	\$6,896	\$5,517	\$1,724	\$5,517	\$357
2010	\$7,310	\$5,848	\$1,827	\$5,848	\$378
2011	\$7,750	\$6,200	\$1,938	\$6,200	\$401



Historical Availability Fees by Customer Class					
Fiscal Year	Single Family Residence	Townhouse or Apartment	Hotel/Motel (per unit charge)	Mobile Home	Non-residential (per fixture unit)
2012	\$7,750	\$6,200	\$1,938	\$6,200	\$401
2013	\$7,750	\$6,200	\$1,938	\$6,200	\$401
2014	\$7,750	\$6,200	\$1,938	\$6,200	\$401
2015	\$7,750	\$6,200	\$1,938	\$6,200	\$401

Source: Wastewater Revenue Sufficiency and Rate Analysis Report FY 2016 through FY 2021

Rate Increase (Availability Fee)

Availability Fee Rates in FY 2015 were not increased based on the projected capital requirements of the program. Additionally, fee increases are not currently anticipated through FY 2021 pending a more detailed pricing analysis.

The single family residence availability fee adopted for FY 2015 is \$7,750. The forecasted fees for the following four fiscal years are summarized below.

Current and Forecasted Availability Fees by Customer Class							
Fiscal Year	Single Family Residence	Lodging House, Hotel, Inn, or Tourist Cabin	Townhouse	Apartment	Mobile Home	Hotel, Motel, Dorm Rental (per unit charge)	Non-residential (per fixture unit)
2015	\$7,750	\$7,750	\$6,200	\$6,200	\$6,200	\$1,938	\$401
2016	\$7,750	\$7,750	\$6,200	\$6,200	\$6,200	\$1,938	\$401
2017	\$7,750	\$7,750	\$6,200	\$6,200	\$6,200	\$1,938	\$401
2018	\$7,750	\$7,750	\$6,200	\$6,200	\$6,200	\$1,938	\$401
2019	\$7,750	\$7,750	\$6,200	\$6,200	\$6,200	\$1,938	\$401
2020	\$7,750	\$7,750	\$6,200	\$6,200	\$6,200	\$1,938	\$401

Sources: Fairfax County Code, Section 67.1-10-2012; FY 2015 Adopted Budget Plan – Wastewater Management Program Overview; and Wastewater Revenue Sufficiency and Rate Analysis Report FY 2016 through FY 2021



Rate Comparison

The table below compares average annual water and sewer service billings and Availability Fees per Single Family Residential Equivalent (SFRE) for Fairfax County with selected other regional jurisdictions. Representative average sewer service billings for the other regional jurisdictions have been developed by applying each jurisdiction’s sewer service rate to appropriate SFRE water usage determined from an analysis of Fairfax Water’s historical average water usage records for SFREs.

Comparison Of Average Sewer Service Charges and Availability Fees for SFREs		
Jurisdiction	Average Monthly Sewer Service Billing^{a,b}	Sewer Availability Fees^{b,c}
Fairfax County – FY 2016	\$46.42	\$7,750
City of Alexandria (served by ARenew)	\$56.50	\$8,404
Arlington County	\$54.36	\$2,760
DC Water	\$68.43	N/A
Loudoun Water	\$47.50	\$7,896
Prince William County	\$36.54	\$10,800
Washington Suburban Sanitary Commission	\$46.96	Unimproved – \$3,500 Improved – \$10,750
Average of Other Jurisdictions	\$51.78	\$7,352

Source: Wastewater Revenue Sufficiency and Rate Analysis Report FY 2016 Through FY 2021 Notes:

- a) Based on a quarterly use of 18,000 gallons which is the Fairfax County average winter quarter use.
- b) Reflects rates in effect January 1, 2015 for other jurisdictions and FY 2014 rates for Fairfax County.
- c) Availability fees reflect differences in the methodology utilized in their development as well as differences in such factors as level of service, regulatory requirements and receipt of grants.



Fee History

A detailed list of availability fees, connection fees and sewer service charges is provided in the following table.

Fee History				
Fiscal Year	Availability Fee (Single Family Residence)	Connection Fee (\$/Front Foot)	Base Charge \$/Qtr/ERC	Sewer Service Charge (\$/1000 gal)
2005	\$5,621	\$6.00	-	\$3.20
2006	\$5,874	\$6.00	-	\$3.28
2007	\$6,138	\$6.00	-	\$3.50
2008	\$6,506	\$6.00	-	\$3.74
2009	\$6,896	\$6.00	\$5.00	\$4.10
2010	\$7,310	\$6.00	\$5.00	\$4.50
2011	\$7,750	\$6.00	\$5.00	\$5.27
2012	\$7,750	\$152.50	\$5.00	\$6.01
2013	\$7,750	\$152.50	\$5.50	\$6.55
2014	\$7,750	\$152.50	\$12.79	\$6.55
2015	\$7,750	\$152.50	\$15.86	\$6.55

Sources: FY 2015 Comprehensive Annual Financial Report

Availability Fees, Connection Charge, Lateral Spur Fees and Sewer Service Charges for FY 2015

Availability Fees

A one-time charge collected from all users prior to connection to the system (due prior to a building permit approval in cases of new construction) to cover, in part, the applicant's proportional share of the cost of facilities required beyond the collector system (i.e. sub-trunk sewers, pumping stations and treatment facilities).

Availability Fees for FY 2015	
Category	Availability Fee
Residential Uses	
Single Family Detached	\$7,750
Lodging House, Hotel, Inn or Tourist Cabin	\$7,750
Townhouse	\$6,200
Apartment	\$6,200
Mobile Home	\$6,200
Any other residential dwelling unit	\$6,200
Hotel, Motel or Dormitory rental unit	\$1,938



Availability Fees for FY 2015	
Category	Availability Fee
Commercial/Other Uses	
Charge Per Drainage Fixture Unit	\$401
Minimum Charge	\$7,750

Source: Fairfax County Code of Ordinances Chapter 67.1 Article 10

Connection Charge

Also frequently called the front footage charge, it is a one-time charge collected from all users prior to connection to the system in those cases where service can be obtained from facilities provided by and at the expense of the County, or persons, firms, or corporations other than the applicant. It is levied as a partial repayment of the costs of collector sewers. Beginning in FY 2011, the amount of the charge was increased from \$6.00 per front foot to \$152.50 per front foot and varies with the length of the lot frontage with a minimum of \$7,625 and a maximum of \$15,250 for single family dwellings, churches, schools, fire stations community centers and certain other community uses. For other uses the footage charge is the same but with a minimum of \$15,250 and no maximum. This charge had previously been unchanged since 1971; however the County’s Sewer Fund could no longer afford to fully fund the Extension and Improvement Program at the historical rates. This charge plus the availability fee and the lateral spur charge recover only up to 50% of the cost incurred by the County to fund the Program.

Lateral Spur Charge

This is a one-time charge, initiated in 1981, amounting to \$600.00 per spur connection. The fee is due prior to connection and applied only to properties connecting to sanitary sewer provided through an Extension and Improvement project where the lateral spurs have been installed by Fairfax County of at the expense of the County.

Sewer Service Charge

The income from this charge is used for the operation and maintenance of existing lines and treatment facilities and other system costs. The details of these charges are presented in the following table.



Schedule of Quarterly Sewer Service Charges (FY 2015)	
Type of Occupancy	Computation Method and Charge
Single Family Dwellings with a separate water service line meter	<p>Six dollars and fifty-five cents (\$6.62) for each 1,000 gallons of water, time the lesser of either:</p> <ul style="list-style-type: none"> • The metered consumption of the respective quarter in the billing year; or • The consumption in the previous winter quarter • <p>The billing year runs from meter readings of June 1 to the following May 31.</p> <p>Winter quarter readings are those made at the regular quarterly reading taken between February 1 and April 30; the actual winter consumption then is averaged for 91.5 days per quarter in a leap year and 91.25 days per quarter in a non-leap year.</p> <p>Customers on wells and those who have not had a full quarter of consumption for the previous winter quarter (new at the location) are billed on the smooth winter average of metered similar occupancies.</p>
All other uses	Six dollars and fifty-five cents (\$6.62) for each 1,000 gallons of water as measured each quarter. No minimum charge.
All users	Base charge of \$15.86 per billing

Notes:

1. Charges are based on consumption as measured by the water service meter(s). Sewer service on unmetered wells is based on smooth winter quarter average or per capita average for single family use, while other uses excluding townhouses, are based on a fixture unit table.
2. Separate, water-only meters may be installed, at the expense of the owner or occupant to measure water that does not flow into the sanitary sewer and for which there is no sewer charge. Sub-meter installation must meet the requirements of the water suppliers (billing agents for Fairfax County).



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Appendix C – Forecasted Financial Statements

The tables presented in this appendix were prepared by Public Resources Management Group, Inc (PRMG) as part of the Fairfax County Wastewater Management Program *Wastewater Revenue sufficiency and Rate Analysis; Forecast Period Fiscal Year 2016 Through Fiscal Year 2021* (February 11, 2016) and are reproduced here, without modification, for informational purposes.



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Table 7
Fairfax County, Virginia
Wastewater Revenue Sufficiency and Rate Analysis

Projected Operating Results and Debt Service Coverage Analysis

Line No.	Description	Projected Fiscal Year Ending June 30,					
		2016	2017	2018	2019	2020	2021
Operating Revenues: [1]							
1	Sewer Service Charges (Retail Customers)	\$ 186,435,103	\$ 194,078,450	\$ 201,001,064	\$ 208,054,350	\$ 217,418,592	\$ 227,130,776
2	Sales of Service (Bulk revenue)	10,252,486	10,376,045	10,487,180	10,597,810	10,707,530	10,819,706
3	Other Revenues [2]	250,000	250,000	250,000	250,000	250,000	250,000
4	Interest Income	641,000	773,000	957,000	1,139,000	1,270,000	1,392,000
5	Other	0	0	0	0	0	0
6	Total Operating Revenues Before Availability Charges	\$ 197,578,589	\$ 205,477,496	\$ 212,695,244	\$ 220,041,159	\$ 229,646,122	\$ 239,592,482
Operating Expenses: [3]							
7	Total Operating Expenses	\$ 100,523,155	\$ 104,021,444	\$ 107,658,997	\$ 110,974,091	\$ 114,336,224	\$ 117,849,907
8	Net Operating Revenues	\$ 97,055,434	\$ 101,456,051	\$ 105,036,247	\$ 109,067,068	\$ 115,309,898	\$ 121,742,575
Non-Recurring Revenues and Revenue Subfund Credit: [4]							
9	Availability Charge Revenues [5]	\$ 18,770,661	\$ 18,536,028	\$ 18,301,394	\$ 18,066,761	\$ 17,832,128	\$ 17,597,495
10	Availability Charge Interest Income [5]	17,000	0	0	0	0	0
11	Other Non-recurring Revenues [6]	82,250	82,843	83,429	84,007	84,577	85,140
12	Moneys Held to Credit of Revenue Subfund [7]	0	0	0	0	0	0
13	Net Revenues [8]	\$ 115,925,345	\$ 120,074,922	\$ 123,421,070	\$ 127,217,836	\$ 133,226,604	\$ 139,425,210
<u>Rate Covenant Test [9]</u>							
TEST 1 - Net Revenue Less Excluded Revenues							
14	Net Revenues [8]	\$ 115,925,345	\$ 120,074,922	\$ 123,421,070	\$ 127,217,836	\$ 133,226,604	\$ 139,425,210
Less: Excluded Revenues [4]:							
15	Availability Charge Revenues	\$ (18,770,661)	\$ (18,536,028)	\$ (18,301,394)	\$ (18,066,761)	\$ (17,832,128)	\$ (17,597,495)
16	Availability Charge Interest Earned	(17,000)	0	0	0	0	0
17	Other Non-recurring Revenues [6]	250,000	250,000	250,000	250,000	250,000	250,000
18	Net Revenues Available Less Excluded Revenues	\$ 97,387,684	\$ 101,788,894	\$ 105,369,675	\$ 109,401,075	\$ 115,644,476	\$ 122,077,715
Debt Service Requirements:							
Principal and Interest Requirements [10]							
19	Sewer Revenue Bonds Series 2004	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
20	Sewer Revenue Bonds Series 2009	9,725,629	9,725,702	9,731,775	9,735,213	9,739,493	9,744,546
21	Sewer Revenue Bonds Series 2012	5,593,067	5,593,016	5,598,350	5,600,038	5,601,808	5,603,840
22	Sewer Revenue Refunding Bonds, Series 2014	5,750,813	5,799,844	5,813,718	5,850,688	5,865,896	5,883,323
23	Series 2017 Bonds [11]	0	7,593,019	7,593,019	7,593,019	7,593,018	7,593,019
24	Series 2019 Bonds [11]	0	0	0	7,820,509	7,820,509	7,820,508
25	Series 2021 Bonds [11]	0	0	0	0	0	4,830,789
26	Total Debt Service Requirements	\$ 21,069,509	\$ 28,711,581	\$ 28,736,862	\$ 36,599,467	\$ 36,620,724	\$ 41,476,025
27	Calculated Coverage	4.62	3.55	3.67	2.99	3.16	2.94
28	Required Coverage	1.25	1.25	1.25	1.25	1.25	1.25
29	Policy Target	2.00	2.00	2.00	2.00	2.00	2.00
-AND-							
TEST 2 - Net Revenues With Excluded Revenues							
30	Net Revenues [8]	\$ 115,925,345	\$ 120,074,922	\$ 123,421,070	\$ 127,217,836	\$ 133,226,604	\$ 139,425,210
Debt Service Requirements:							
Subordinate Obligations [12]:							
31	VRA/VRLF 2001 C-515259-01	\$ 2,791,078	\$ 2,791,078	\$ 2,791,078	\$ 2,791,079	\$ 2,791,079	\$ 1,628,129
32	VRA/VRLF 2002 C-515273-01	3,412,198	3,412,199	3,412,199	3,412,198	3,412,199	3,412,199
33	Subtotal VRA Debt Service	\$ 6,203,276	\$ 6,203,277	\$ 6,203,277	\$ 6,203,277	\$ 6,203,278	\$ 5,040,328
UOSA Subordinate Debt							
34	UOSA Existing Subordinate Debt	\$ 20,188,946	\$ 20,207,514	\$ 20,214,815	\$ 20,226,446	\$ 19,891,666	\$ 20,365,582
35	Subtotal UOSA Debt Service	\$ 20,188,946	\$ 20,207,514	\$ 20,214,815	\$ 20,226,446	\$ 19,891,666	\$ 20,365,582
36	Total Subordinate Obligations	\$ 26,392,222	\$ 26,410,791	\$ 26,418,092	\$ 26,429,723	\$ 26,094,944	\$ 25,405,910
37	Principal and Interest Requirements [10]	\$ 21,069,509	\$ 28,711,581	\$ 28,736,862	\$ 36,599,467	\$ 36,620,724	\$ 41,476,025
38	Total Debt Service Requirements	\$ 47,461,731	\$ 55,122,372	\$ 55,154,954	\$ 63,029,190	\$ 62,715,668	\$ 66,881,935

Continued to Following Page / Footnotes on Page 2 of 2.

Table 7
Fairfax County, Virginia
Wastewater Revenue Sufficiency and Rate Analysis

Projected Operating Results and Debt Service Coverage Analysis

TEST 2 - Net Revenues With Excluded Revenues (continued from prior page)

39	Calculated Coverage	2.44	2.18	2.24	2.02	2.12	2.08
40	Required Minimum Coverage	1.00	1.00	1.00	1.00	1.00	1.00
41	Min. Recommended Target for Test 2 - 1.50	1.50	1.50	1.50	1.50	1.50	1.50
42	Net Revenues [8]	\$ 115,925,345	\$ 120,074,922	\$ 123,421,070	\$ 127,217,836	\$ 133,226,604	\$ 139,425,210
	Less Transfers to Other Funds [13]:						
43	Debt Service Subfund [14]	\$ 21,069,509	\$ 28,711,581	\$ 28,736,862	\$ 36,599,467	\$ 36,620,724	\$ 41,476,025
44	Subordinate Obligations Subfund [15]	26,392,222	26,410,791	26,418,092	26,429,723	26,094,944	25,405,910
45	Amount Available for Other Purposes	<u>\$ 68,463,614</u>	<u>\$ 64,952,550</u>	<u>\$ 68,266,116</u>	<u>\$ 64,188,646</u>	<u>\$ 70,510,936</u>	<u>\$ 72,543,275</u>

Footnotes:

[1] Operating Revenues reflect rates recently adopted by the Board of Supervisors pursuant to the Rate Ordinance.

	Projected Fiscal Year Ending June 30,					
	2016 (Existing)	2017 (Adopted)	2018 (Adopted)	2019 (Adopted)	2020 (Identified)	2021 (Identified)
Recommended Rates						
Quarterly Base Charge	\$ 20.15	\$ 24.68	\$ 27.62	\$ 30.38	\$ 33.42	\$ 36.76
Flow Charge	\$ 6.65	\$ 6.68	\$ 6.75	\$ 6.85	\$ 7.05	\$ 7.21
Effective Rate Revenue Adjustment (%)		3.6%	3.1%	3.0%	4.0%	4.0%

[2] Amounts shown include other miscellaneous revenues of the System (customer service fees, sale of property, etc.); amounts do not include Non-Recurring Revenues associated with lateral spur fees and connection charges.

[3] Amounts include the Operating Component of the Cost of Contracted Services, i.e., treatment by contract (TbCs) costs. Amounts shown do not include depreciation and amortization expenses, which are non-cash expenses and are not considered Operating Expenses as defined in the General Bond Resolution.

[4] The sum of the amounts shown for Non-recurring Revenue and the Revenue Subfund credit balance is defined in the General Bond Resolution as the "Excluded Revenues".

[5] Amounts shown represent fees charged to new development and interest income earned on the balance of deposits from such fees for the allocable share of conveyance, treatment and disposal capacity constructed by the County for the benefit of such development.

[6] Amounts shown include lateral spur fees, connection charges for meter replacement and other similar charges which are considered as a Non-recurring Revenues in the General Bond Resolution (represents a one-time charge generally to new development to initiate or receive service).

[7] Pursuant to the General Bond Resolution, Net Revenues shall include income previously received and currently held by the County to the credit of the Revenue Subfund and all rights to receive the same (cash and cash equivalents). For the purposes of this report, no recognition for the availability of funds held by the County in the Revenue Subfund has been assumed for purposes of determining Net Revenues as defined in the General Bond Resolution; such amounts were assumed to be available for ongoing System purposes (Operating Expenses and Capital Project Funding) exclusive of compliance with the rate covenant per the General Bond Resolution.

[8] Net Revenues as defined in the General Bond Resolution includes: i) Non-recurring Revenues (e.g., availability fee revenue and investment earnings on available balances, connection fees, reconnection fees, charges for meter replacements, etc.); and ii) income previously received and currently held by the County to the credit of the Revenue Subfund and all rights to receive the same.

[9] Rate Covenant requirements as defined in the General Bond Resolution under Article V, Section 501.

[10] Amounts shown reflect Debt Service Requirement on all Outstanding Bonds and Additional Parity Bonds assumed to be issued during the Forecast Period on parity with the Outstanding Bonds. Amounts shown reflect payments required to the Sinking Fund (accrual basis) and not when such Bonds are paid.

[11] The financial forecast assumes the issuance of additional parity bonds during the Fiscal Years 2017, 2019 and 2021 to fund certain improvements to the System. The terms of the debt assume: i) level annual debt service payments over a 30 year repayment period; ii) interest rate of ranging from 5.5% - 6.0%; iii) debt service reserve funded from the debt proceeds; and iii) issuance costs equal to 2.5% of the principal amount of bonds.

[12] Subordinate Obligations as defined in the General Bond Resolution includes any Debt Service Component of the Cost of Contracted Services (for the UOSA debt obligation) (other than Parity Debt Service Components) and any other obligations of the County with respect to the System (VRA obligations).

[13] Amounts shown reflect transfers to other subfunds as delineated in the General Bond Resolution.

[14] Amounts shown reflect transfers to the Debt Service Subfund associated with the payment of the Principal and Interest Requirements on the Outstanding and Additional Parity Bonds based on the deposit requirements delineated in the General Bond Resolution (on an accrual basis and not when the payments are made). Also included in the recognized deposits would be funds required to pay Parity Indebtedness, if any, which are required to be set aside in a special account in the Debt Service Subfund.

[15] Amounts shown reflect transfers to the Subordinate Obligations Subfund associated with the payment of debt on any loans considered subordinate to the Senior Lien Bonds and the Parity Indebtedness.

Table 12
Fairfax County, Virginia
Wastewater Revenue Sufficiency and Rate Analysis

Forecasted Statements of Flows of Financial Resources and Changes in Fund Balance

Line No.		Projected Fiscal Year Ending June 30,					
		2016	2017	2018	2019	2020	2021
1	Beginning Balance [1]	\$ 142,814,192	\$ 101,298,805	\$ 163,964,373	\$ 117,370,489	\$ 169,538,643	\$ 115,228,578
	<u>Operating Revenues:</u>						
2	Sewer Service Charges [2]	\$ 186,435,103	\$ 194,078,450	\$ 201,001,064	\$ 208,054,350	\$ 217,418,592	\$ 227,130,776
3	Sales of Service (Bulk Revenue)	10,252,486	10,376,045	10,487,180	10,597,810	10,707,530	10,819,706
4	Other Operating Revenues [3]	332,250	332,843	333,429	334,007	334,577	335,140
5	Subtotal Operating Revenues	\$197,019,839	\$204,787,339	\$211,821,672	\$218,986,166	\$228,460,700	\$238,285,622
	<u>Non -Operating Revenues:</u>						
6	Proposed (New) Debt Proceeds [4]	\$ -	\$ 100,000,000	\$ -	\$ 100,000,000	\$ -	\$ 60,000,000
7	Additions to Debt Reserve Fund [4]	-	7,593,019	-	7,820,509	-	4,830,789
8	Availability Fees	18,787,661	18,536,028	18,301,394	18,066,761	17,832,128	17,597,495
9	Unrestricted Interest Earned	641,000	773,000	957,000	1,139,000	1,270,000	1,392,000
10	Restricted Interest Income [5]	21,000	120,000	140,000	159,000	179,000	-
11	Grants	-	-	-	-	-	-
12	Subtotal	\$ 19,449,661	\$ 127,022,046	\$ 19,398,394	\$ 127,185,270	\$ 19,281,128	\$ 83,820,284
13	<u>TOTAL FUNDS AVAILABLE</u>	\$ 359,283,692	\$ 433,108,190	\$ 395,184,440	\$ 463,541,925	\$ 417,280,470	\$ 437,334,484
	<u>Operating Expenses</u>						
14	Personnel Services	\$ 31,943,179	\$ 32,801,176	\$ 34,174,215	\$ 35,180,552	\$ 36,222,506	\$ 37,302,454
15	Operating Expenses	26,155,840	26,997,733	27,835,826	28,771,230	29,681,823	30,662,438
16	Recovered Costs	(568,278)	(580,006)	(591,976)	(604,195)	(616,796)	(629,661)
17	TBC and Billing Agent Costs	42,992,414	44,802,541	46,240,933	47,626,504	49,048,690	50,514,676
18	Subtotal	\$ 100,523,155	\$ 104,021,444	\$ 107,658,997	\$ 110,974,091	\$ 114,336,224	\$ 117,849,907
	<u>Capital Expenses by Funding Source</u>						
19	Cash Reserves / Rate Revenues [6]	\$ 94,905,625	\$ 49,880,000	\$ 74,860,000	\$ 59,841,000	\$ 84,821,000	\$ 70,000,000
20	Availability Charge Fund	6,845,784	-	-	-	-	-
21	Existing Debt Proceeds	8,248,591	120,000	140,000	159,000	179,000	-
22	New Debt Proceeds [7]	-	60,000,000	40,000,000	60,000,000	40,000,000	60,000,000
23	Grant Funding	-	-	-	-	-	-
	Use of Operating Reserves to Fund UOSA	-	-	-	-	-	-
24	Subtotal	\$ 110,000,000	\$ 110,000,000	\$ 115,000,000	\$ 120,000,000	\$ 125,000,000	\$ 130,000,000
	<u>Debt Service:</u>						
25	Existing Senior Debt Service	\$ 21,069,509	\$ 21,118,562	\$ 21,143,843	\$ 21,185,939	\$ 21,207,197	\$ 21,231,709
26	Proposed Senior Debt Service [4]	-	7,593,019	7,593,019	15,413,528	15,413,527	20,244,316
27	Existing Subordinate Debt Service	26,392,222	26,410,791	26,418,092	26,429,723	26,094,944	25,405,910
28	Proposed Subordinate Debt Service [7]	-	-	-	-	-	-
29	Subtotal	\$ 47,461,731	\$ 55,122,372	\$ 55,154,954	\$ 63,029,190	\$ 62,715,668	\$ 66,881,935
30	<u>TOTAL USE OF FUNDS</u>	\$ 257,984,886	\$ 269,143,816	\$ 277,813,951	\$ 294,003,281	\$ 302,051,892	\$ 314,731,842
31	<u>ENDING BALANCE BEFORE RESERVES</u>	\$ 101,298,806	\$ 163,964,374	\$ 117,370,489	\$ 169,538,644	\$ 115,228,578	\$ 122,602,642
	<u>RESERVES / RESTRICTIONS:</u>						
32	Operating Reserve Target (150 Days)	\$ 41,310,886	\$ 42,748,539	\$ 44,243,424	\$ 45,605,791	\$ 46,987,489	\$ 48,431,469
33	Debt Reserve Balance	27,562,867	35,155,886	35,155,886	42,976,395	42,976,395	47,807,184
34	Debt Proceeds	-	40,000,000	-	40,000,000	-	-
35	Availability Charge Balance	-	-	-	-	-	-
36	Sewer Construction Fund - 69300A [8]	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
37	Subtotal	\$ 73,873,753	\$ 122,904,425	\$ 84,399,310	\$ 133,582,186	\$ 94,963,884	\$ 101,238,653
38	<u>UNRESTRICTED ENDING BALANCE</u>	\$ 27,425,052	\$ 41,059,949	\$ 32,971,179	\$ 35,956,458	\$ 20,264,694	\$ 21,363,989

Table 12
Fairfax County, Virginia
Wastewater Revenue Sufficiency and Rate Analysis

Forecasted Statements of Flows of Financial Resources and Changes in Fund Balance

Footnotes:

- [1] Reflects starting fund balance, but is exclusive of funds held in the debt service sinking fund.
 [2] Includes recommended rate adjustments as follows:

	Projected Fiscal Year Ending June 30,					
	2016 (Existing)	2017 (Adopted)	2018 (Adopted)	2019 (Adopted)	2020 (Identified)	2021 (Identified)
Quarterly Base Charge	\$ 20.15	\$ 24.68	\$ 27.62	\$ 30.38	\$ 33.42	\$ 36.76
Flow Charge	\$ 6.65	\$ 6.68	\$ 6.75	\$ 6.85	\$ 7.05	\$ 7.21
Effective Rate Revenue Increase	n/a	3.6%	3.1%	3.0%	4.0%	4.0%

- [3] Represents other operating revenues from lateral spur fees, connection charges, miscellaneous revenues, sale of property, etc.
 [4] Represents the proposed issuance of the Series 2017 Bonds on or about July 1, 2016, the Series 2019 Bonds on or about July 1, 2018 and the Series 2021 Bonds on or about July 1, 2019. Terms assume 30 year level debt with proceeds to fund deposits to the debt service reserve fund.
 [5] Includes Interest Income on debt proceeds and availability charge fund balances.
 [6] Includes capital funding from rate revenues, E&I fund balances and operating reserves.
 [7] Represents additional debt service from UOSA issued bonds on behalf of the County.
 [8] Represents restricted funds held on balance within the SC Fund for line extensions.

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Fairfax County
Wastewater
Management

Fairfax County is committed to a policy of nondiscrimination in all County programs, services, and activities and will provide reasonable accommodations upon request. Special accommodations/alternative information formats will be provided upon request.

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